NOVEMBER 7, 1936

Railway Age

Founded in 1856

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RELIABILITY...

. . . The reliability factor of the Pullman Air Conditioning System is 99 6/10 per cent.

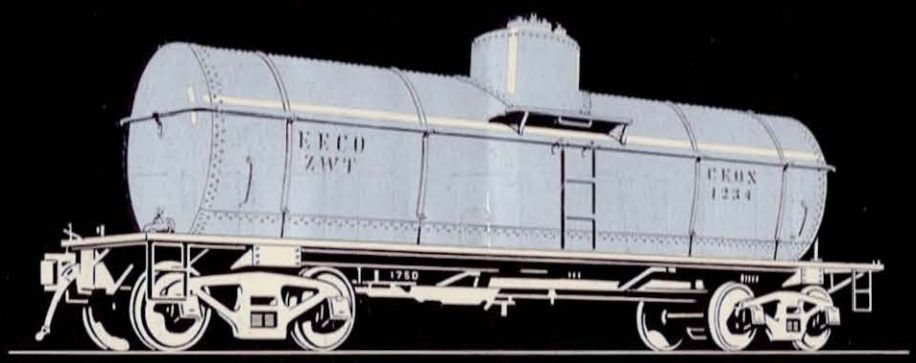
Dependable performance means satisfied passengers and—*lower costs.*

PULLMAN-STANDARD CAR MANUFACTURING CO.

PULLMAN
AIR CONDITIONING SYSTEM

IN USE ON OVER 2900 CARS ON 30 RAILROADS

WILL YOUR PRODUCT ARRIVE BETTER



IN ALCOA ALUMINUM?

ALCOA

The list of products now regularly transported in Aluminum includes glacial acetic acid, formaldehyde, hydrogen peroxide, turpentine, rosin, edible oils, vinegars, and other foodstuffs.

For some of these, purity of the product is the all important consideration. Aluminum gives them the necessary protection, year in and year out.

Other substances ordinarily create a severe problem of car maintenance. Aluminum tank cars require no lining or treatment. No renewal of the inner surface is needed. Maintenance cost is minimized.

Not only the tanks, but all fittings and accessories are supplied in Aluminum. The tanks may be riveted or welded; welded tanks are preferred where cleaning is customary, because they present a smooth, easily scrubbed inner surface.

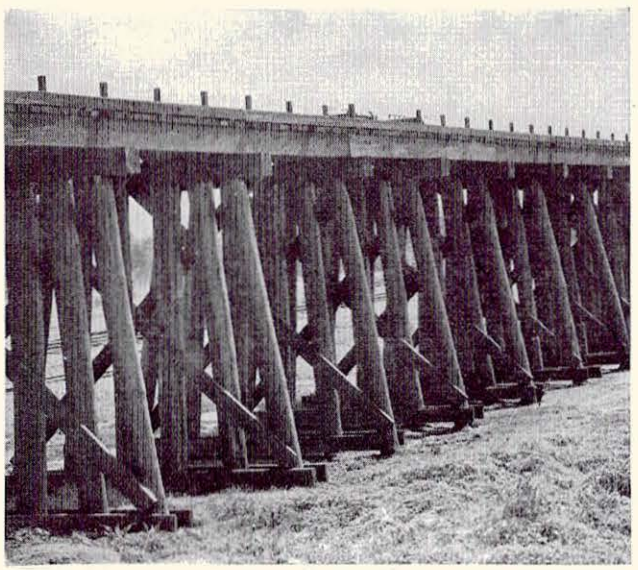
The advantages of lightness and rugged strength, obtained on modern Streamliners by use of Alcoa Aluminum, also apply to tank cars built of the metal. The designer can make light Aluminum thick enough to get stiffness and high strength, without adding undesirable weight.

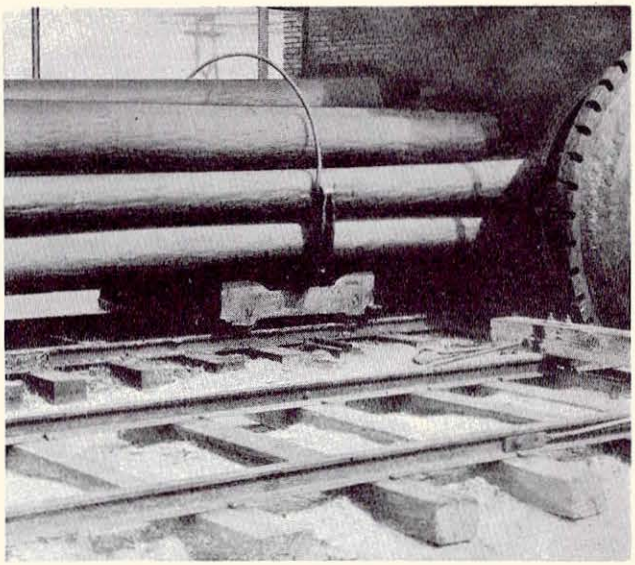
Your product may travel cheaper and arrive better in Aluminum tank cars. Our Development Engineers will be glad to help you make tests to determine the suitability of Aluminum to your product; and several manufacturers can offer you equipment at reasonable cost. ALUMINUM COMPANY OF AMERICA, 2178 Gulf Building, Pittsburgh, Pa.

ALCOA ALUMINUM

Published weekly by Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

DEPENDABLE PILING





for **BRIDGE CONSTRUCTION**

For nearly half a century Railroads have relied upon "WOOD PRESERVING" Treated Timber Products in construction, improvement and maintenance of their Railway Roadbeds, Bridges, Terminals, Docks and other fixed Properties.

All types of bridge material are subject to two kinds of destructive action—load stresses and exposure to the elements. Bridges and other structures built with "WOOD PRESERVING" adequately pressure treated piling and timber materials at low additional first cost give maximum service life at minimum annual maintenance expense.

THE WOOD PRESERVING CORPORATION KOPPERS

THE WOOD PRESERVING CORPORATION

KOPPERS BUILDING . . . PITTSBURGH, PENNA.

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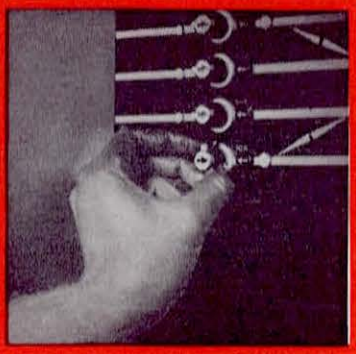
ENTRANCE

MODERN OPERATION

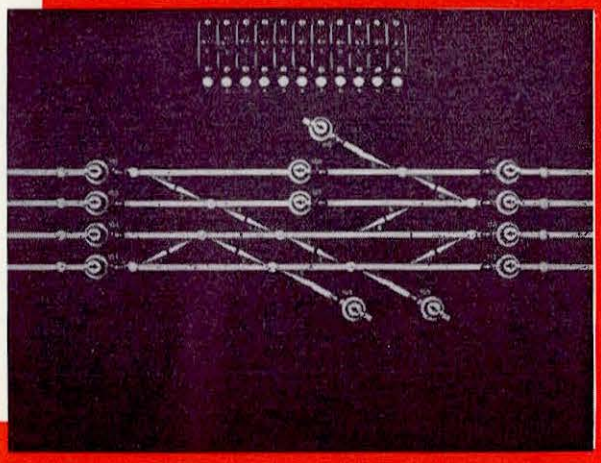
The directing of trains through any interlocking plant basically resolves itself into the setting up of routes. Every route has an "entrance" and an "exit."

The system of **NX** (eNtrance-eXit) **ELECTRIC INTERLOCKING,** built on former systems of interlocking, uses this basic principle in simplifying the directing of trains.

"Entrance-Exit" control and complete information make the directing of trains smooth, coordinated, and simple. It is the modern way.



To set up any route, the operator turns the "entrance knob,"



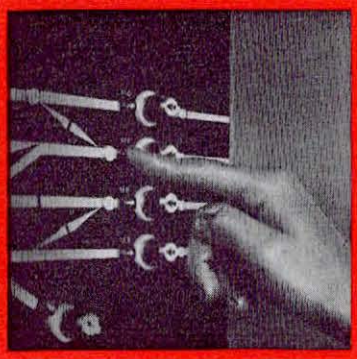
The operating panel resembles the track layout. At the "entrance" of every route is an "entrance knob;" at the "exit" of every route, an "exit button."

GENERAL RAILWAY SIGNAL COMPANY

New York Chicago ROCHESTER, N. Y. St. Louis A-1356

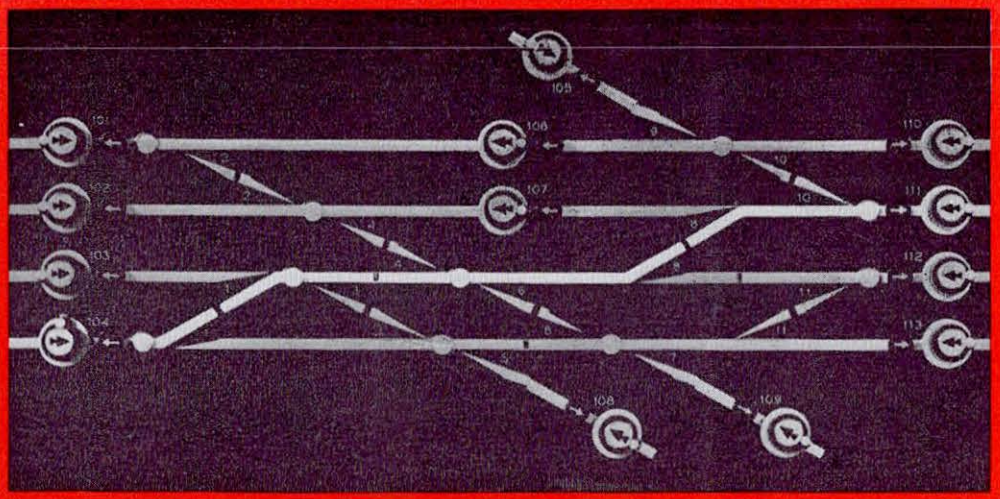
EXIT

on a BASIC PRINCIPLE



and pushes the "exit button."

NX
ELECTRIC INTERLOCKING



Automatically the route is lined up, both in the field and on the operating panel. The route is plainly indicated, as is also the clearing of the signal and the presence of every train in the control area.

Bulletin 167, a description of this system will be mailed on request.

Different - but Symb

DO YOU KNOW

—that the railroads haul a ton of freight a mile for an average revenue of less than a cent?

—that the speed of freight trains has been stepped up 43% in recent years?

—that by increasing the efficiency of combustion the railroads have cut fuel costs a half billion dollars in the past ten years?

—that 45 cents of every dollar the railroads take in go for railroad payrolls?

—that the railroads maintain their own "highways" — a quarter of million miles of "line"?

—that many railroads will carry your automobile to vacation spots for the price of a third ticket?

—that railroad fares throughout the United States have been reduced as much as 44%, and that Pullman accommodations now cost one-third less than before?

—that you are far safer on a railroad train than you are in your own home?

GO PLACES—NOW—BY TRAIN

Rates are low — Safety, Speed and Comfort greater than ever before!

No other transportation in the world can match the American railroads for speed with safety. And every modern convenience contributes to your comfort when you go by rail. Practically all through trains are air-conditioned—cleaner, quieter, healthier. You have modern lighting, excellent food, restful seats, comfortable beds, plenty of room to move around, and you get there on schedule. Yet with all the improvements railroads offer today, fares have been steadily lowered both in coaches and Pullmans.

1/16TH OF AN INCH SAVES MILLIONS

The railroads use, annually, 350 *billion* gallons of water! Much of it normally contains various mineral substances capable of forming a scale on the insides of locomotive boiler tubes and flues. A scale only one sixteenth of an inch in thickness can necessitate an increase in fuel consumption of 15%! But modern railroad research has found the way to soften the water used in locomotives and to treat it chemically with the result that locomotive life, efficiency and safety have been tremendously increased. This is but one of the many rewards of the roads' pioneering efforts along a wide front of studies. If all the research activities carried on by the American railroads were concentrated in one huge laboratory it would require an institution housing thousands of men and providing millions of square feet of floor space. Six railroads, two universities, and ten supply companies alone, for example, maintain a permanent research personnel of about 1,000 people.

PIONEERING STILL GOES ON!

SAFETY FIRST—
friendliness too!

ols of the Same Idea

THERE is scarcely a section of this nation that is not witnessing today dramatic evidence of the progressiveness of the American railroads.

This evidence may take the form of faster freight and passenger schedules, wider use of air-conditioned cars, door-to-door handling of freight, lower rates, or constant improvements in the all-important roadway.

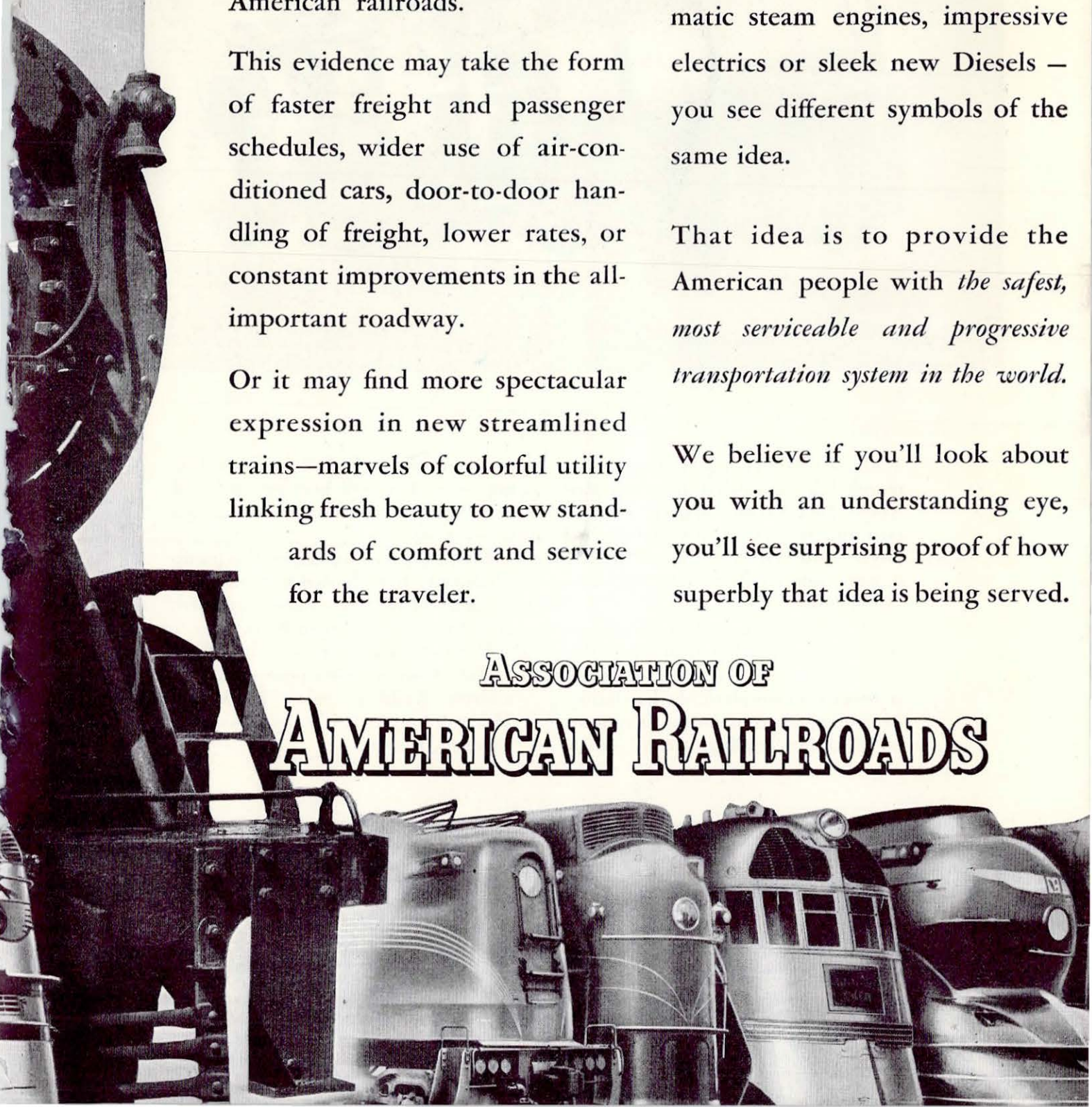
Or it may find more spectacular expression in new streamlined trains—marvels of colorful utility linking fresh beauty to new standards of comfort and service for the traveler.

In whatever form you see these examples of enterprise – whether in the workaday running of the railroads or spotlighted in dramatic steam engines, impressive electrics or sleek new Diesels – you see different symbols of the same idea.

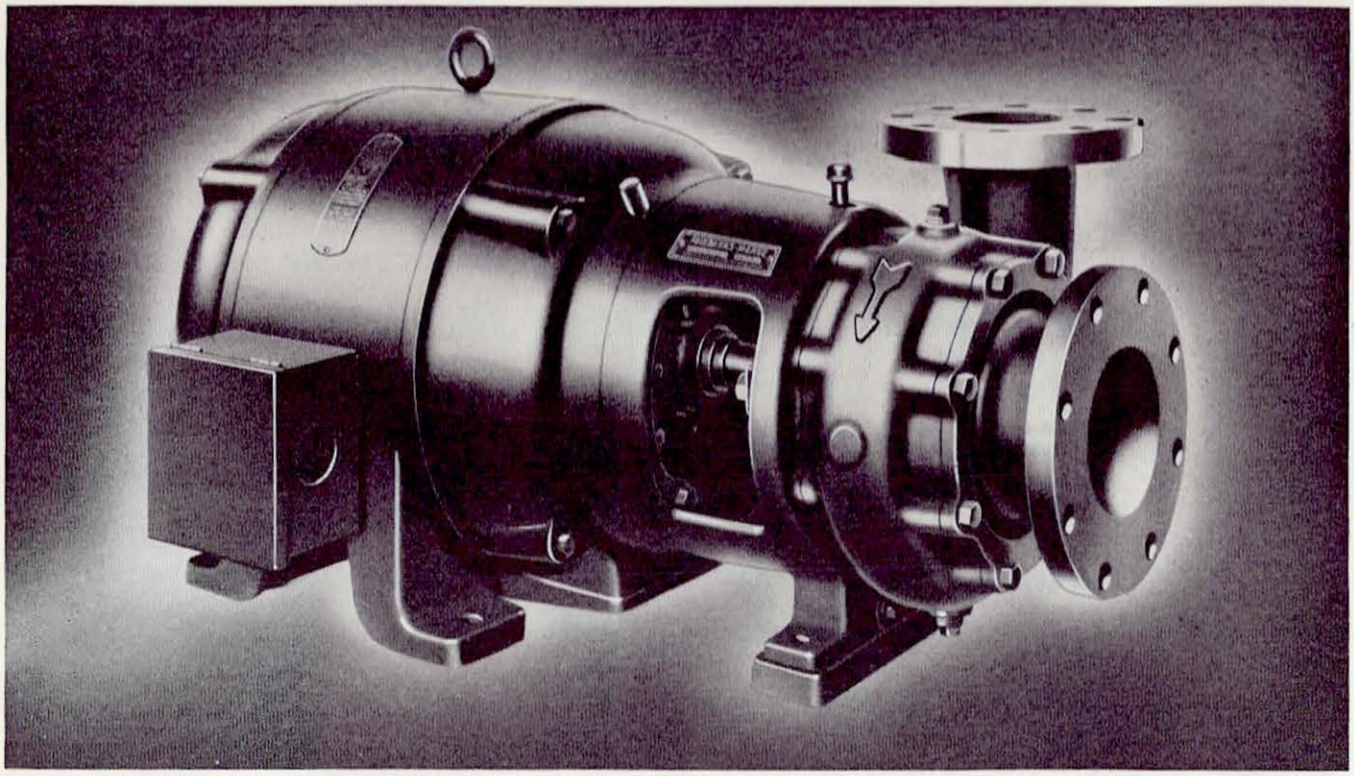
That idea is to provide the American people with *the safest, most serviceable and progressive transportation system in the world.*

We believe if you'll look about you with an understanding eye, you'll see surprising proof of how superbly that idea is being served.

ASSOCIATION OF
AMERICAN RAILROADS



BUILT TO HANDLE A tough job



When railroads and industry demanded a motor-driven pump that would go into an exposed working position, mount in any position or angle, and still handle up to 1000 g.p.m., our engineers started from the bottom up.

They designed a highly efficient side suction centrifugal pump with a bronze impeller. Then they mounted it directly on the shaft of a Fairbanks-Morse splashproof motor. There are no flexible couplings or alignment problems to contend with. The rotating element is ball bearing mounted and requires only one or two greasings a year.

Requiring no foundation, this pump needs only to be bolted into place, its suction and discharge lines connected, and it is ready for operation.

For full particulars on what these "5550" built-together pumps can do, address Railroad Sales, Fairbanks, Morse & Co., N701 S. Wabash Avenue, Chicago, Illinois.

6808—PA21.3

106 YEARS OF PRECISION MANUFACTURING

FAIRBANKS-MORSE

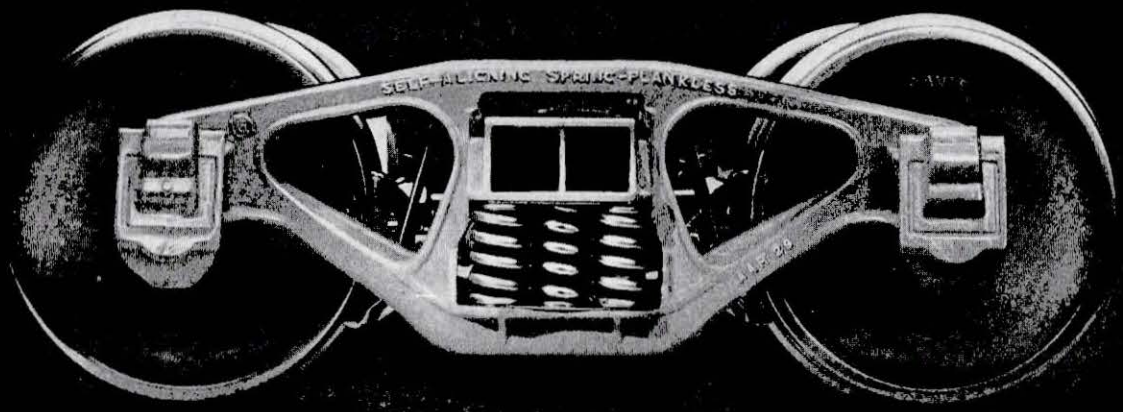
Pumps

POWER, PUMPING AND WEIGHING EQUIPMENT

AMERICAN STEEL FOUNDRIES

SELF-ALIGNING TRUCK

NO SPRING PLANK



Minimum number of parts.

Lightest possible weight.

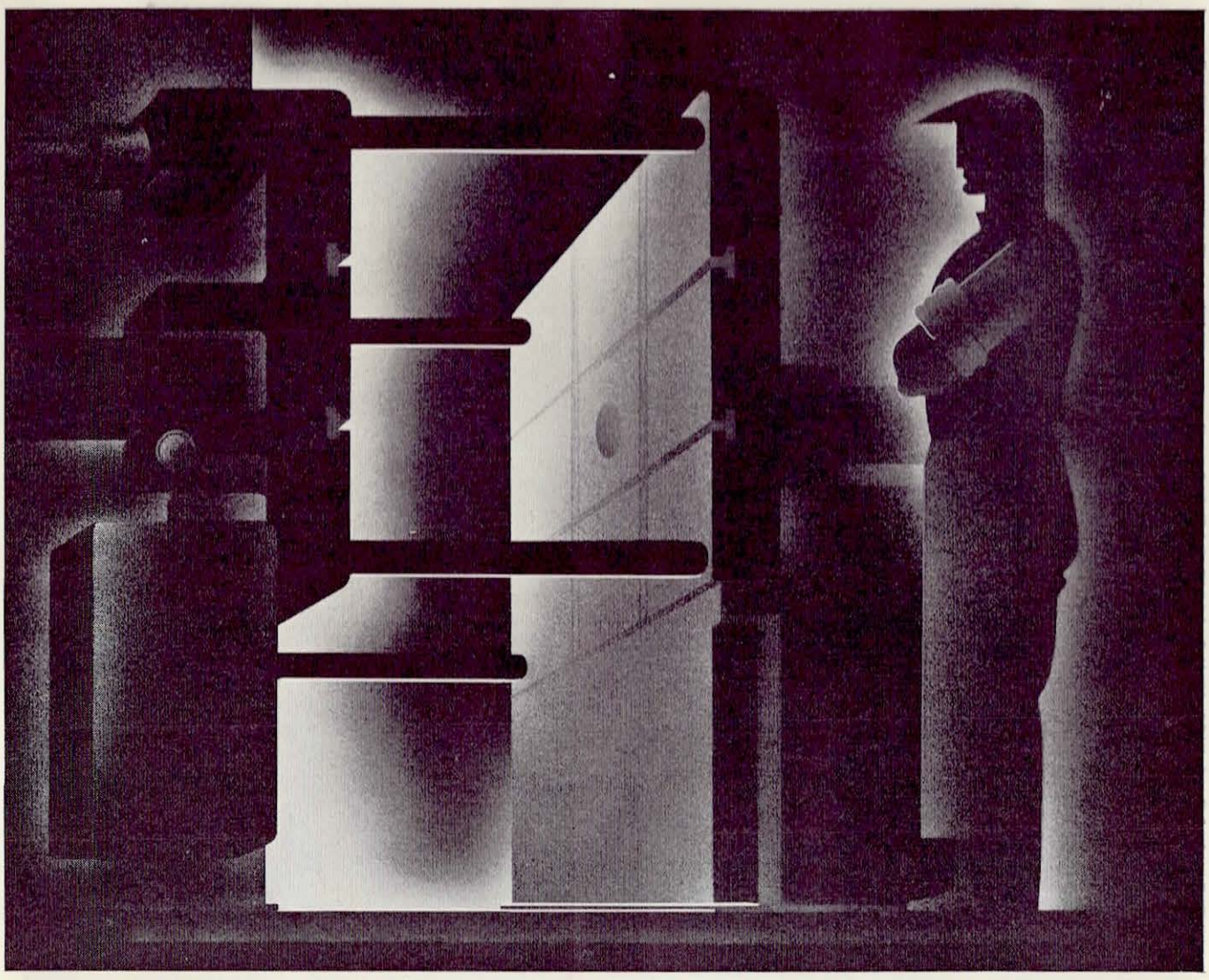
Spring seat one level; simplifies inspection and shimming.

Coil springs A.A.R. standard.

Design tested and approved by A.A.R.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



LONGER LIFE means LOWER COSTS

EXPENDABLE parts of production machines can easily be a thorn in the side of the management. . . . Parts, removal, installation and production interruptions—all cost money.

Whether parts are made from steel or iron, Moly adds to their effective life. One striking example is that of a permanent mold machine producing radiator nipples. Adding .50% Moly to the mold iron increased the production life of the molds 300%—because Moly iron is more resistant to heat impact. The unit production cost of the nipples was reduced.

Every one is interested in long life and reduced maintenance costs for production machines. Moly steels and irons have helped in many cases—in many industries. Investigate their application to the things you make or the machines you use. It will pay you.

Our technical book, "Molybdenum," and our periodical news-sheet, "The Moly Matrix," are yours for the asking; while the facilities of our laboratory are always available for the study of knotty steel or iron problems. Climax Molybdenum Company, 500 Fifth Avenue, New York City.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

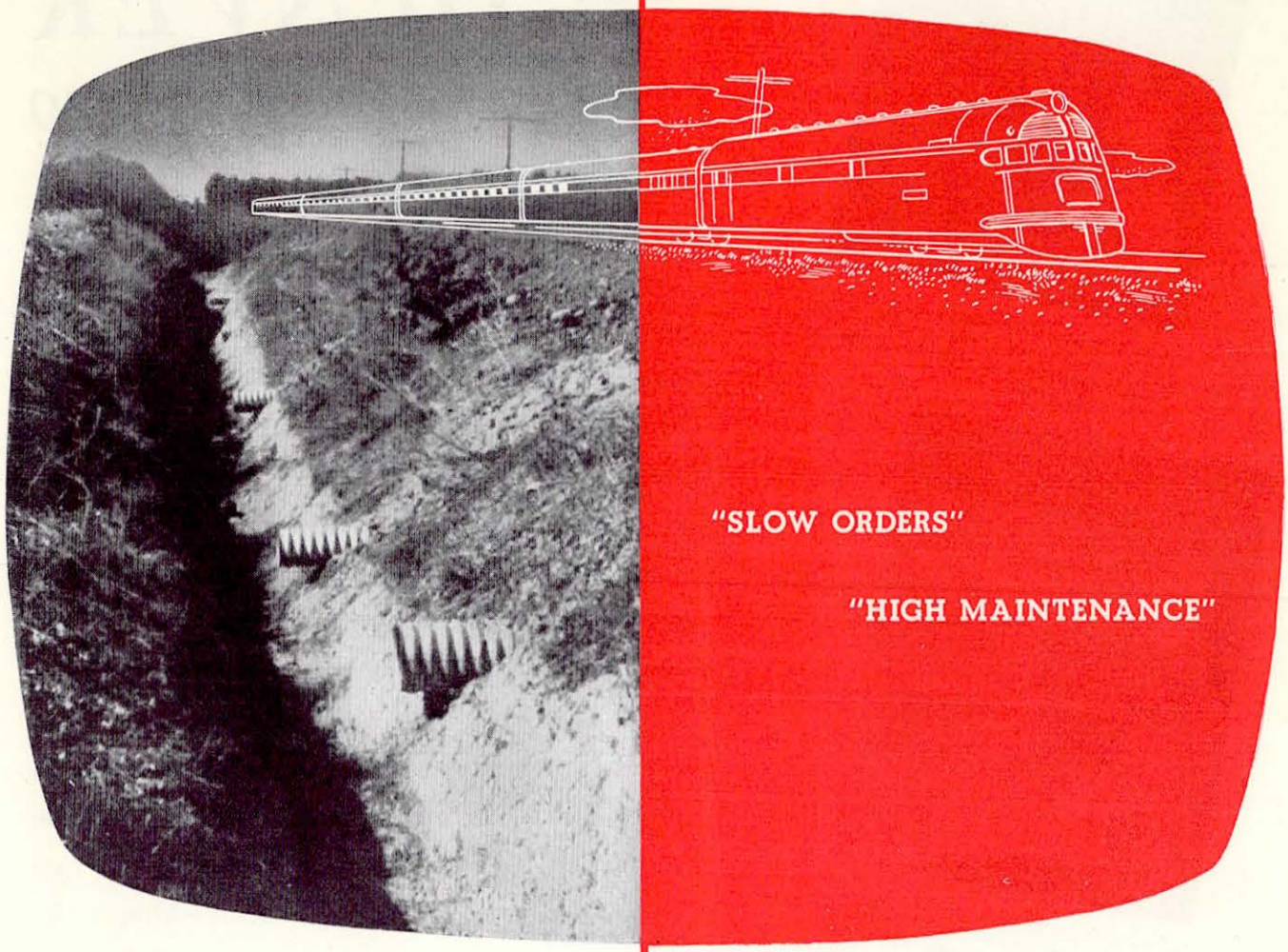
MOLY

CLIMAX Mo-lyb-den-um

CUTS COSTS

CREATES SALES

EVERY TIME YOUR TRAINS CROSS THIS LINE



THEY ARE OPERATING "IN THE RED"

• If you've analyzed your operating ratio *by districts*, you know that certain mileages of track are a constant drain on your profits—due to slow orders and excessive maintenance. But here's good news! There is a way to eliminate those costly red districts and make them *earn* money for you, instead of spending it.

The way lies through a *systematic program of subdrainage*. This has been proved time and again by every railroad that has adopted it. Slow orders have been eliminated. Safety and passenger comfort have been improved. And maintenance costs on one road alone have been reduced as much as 14 million dollars the first year. Being specialists in subdrainage, Armco engineers can undoubtedly give valuable assistance to your own maintenance staff. Address:

INGOT IRON RAILWAY PRODUCTS CO.
(Member of the Armco Culvert Manufacturers Association)
MIDDLETOWN, OHIO • BERKELEY, CALIFORNIA • PHILADELPHIA
MINNEAPOLIS • LOS ANGELES • ST. LOUIS • PORTLAND
DALLAS • ATLANTA • CLEVELAND • SPOKANE • CHICAGO
DENVER • RICHMOND • HOUSTON • SALT LAKE CITY

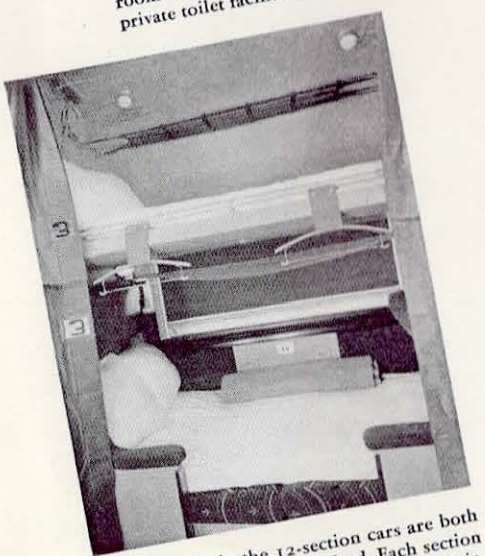
ARMCO

Believing that every railway executive will be interested in these economy-facts, we have included them in this special 8-page bulletin. Request your free copy from our nearest office. There's no obligation.

ECONOMIZE WITH SUBDRAINAGE

SIXTEEN HOURS OF *The* DENVER *GO INTO*

• Sleeping accommodations in the all-room cars are most complete and luxurious. Each room is individually decorated, and has all private toilet facilities.

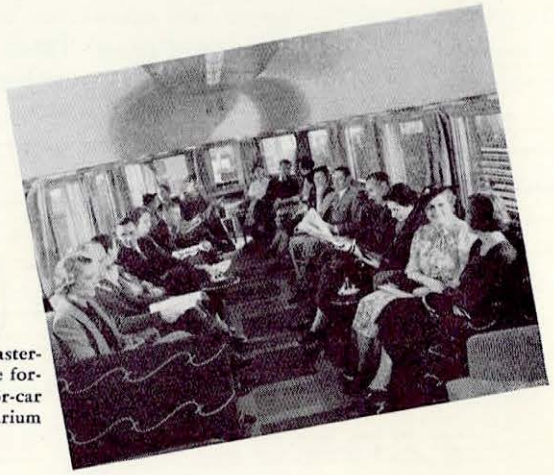


• The berths in the 12-section cars are both wider and longer than standard. Each section has an individual color scheme. All have air-conditioning outlets.

• All of the comfortable seats in the coaches are individually numbered and assigned. Individual lights over each seat may be operated by the passenger.

"THE FINEST TRAINS EVER BUILT"—these new 12-car, stainless-steel trains have been called. And this unqualified praise is completely justified. Flashing over the 1039 miles between Chicago and Denver at an average speed of 65 miles per hour, the Denver Zephyrs are the final accomplishment in fast, luxurious, overnight travel. Their equipment includes sleeping cars, all-room cars, parlor cars, de luxe coaches with reclining chairs, lounges, diners and observation cars. No detail that might contribute to the luxury of travel has been overlooked. Here is everything the overnight passenger might desire.

Diesel-electric powered, these new trains have an over-all length of 883 feet, 9 inches. The cars are wider than standard equipment, providing wider seats and berths, and an impressive air of spaciousness. Windows are unusually long—some fully 5½ feet across. Because of innovations in the trucks and carriages, these Budd-built trains have exceptionally smooth riding qualities.



• The observation lounge is a masterpiece of the decorator's art. The forward half is devoted to parlor-car passengers. To the rear is the solarium lounge, shown above.

DENVER ZEPHYRS

HIGH-SPEED LUXURY
ZEPHYRS
SERVICE

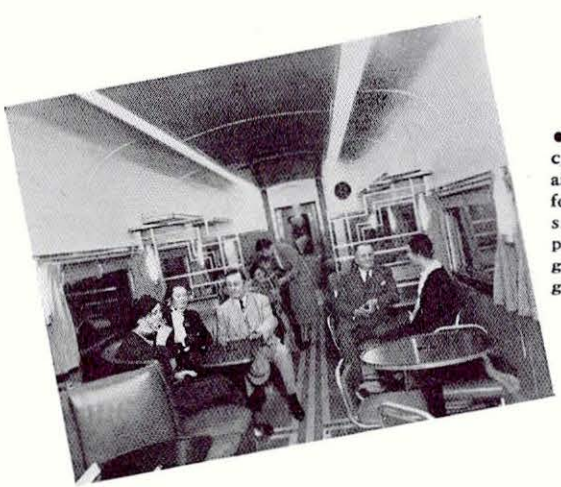
Built of high-tensile stainless steel by the Budd System of Light-Weight Construction, these new trains are homogeneous shells of virtually indestructible metal. Because stainless steel has four times the elastic strength of ordinary steel, these gleaming trains exceed all ordinary requirements of safety. Fabricated by the "Shotweld" process, Budd-built trains are increasing revenue—lowering operating costs—wherever they are in service.

Do you want the inside story of Budd-built streamlined trains? . . . Let us send you "The Conquest of Weight."

BUDD METHODS SAFELY ELIMINATE DEAD-WEIGHT

EDW. G. BUDD MANUFACTURING COMPANY

RAILWAY DIVISION PHILADELPHIA, PA.



• At the rear of the cocktail lounge, the aisle seats are hinged for easy access. In this smart car a radio-phonograph supplies a gay musical background.

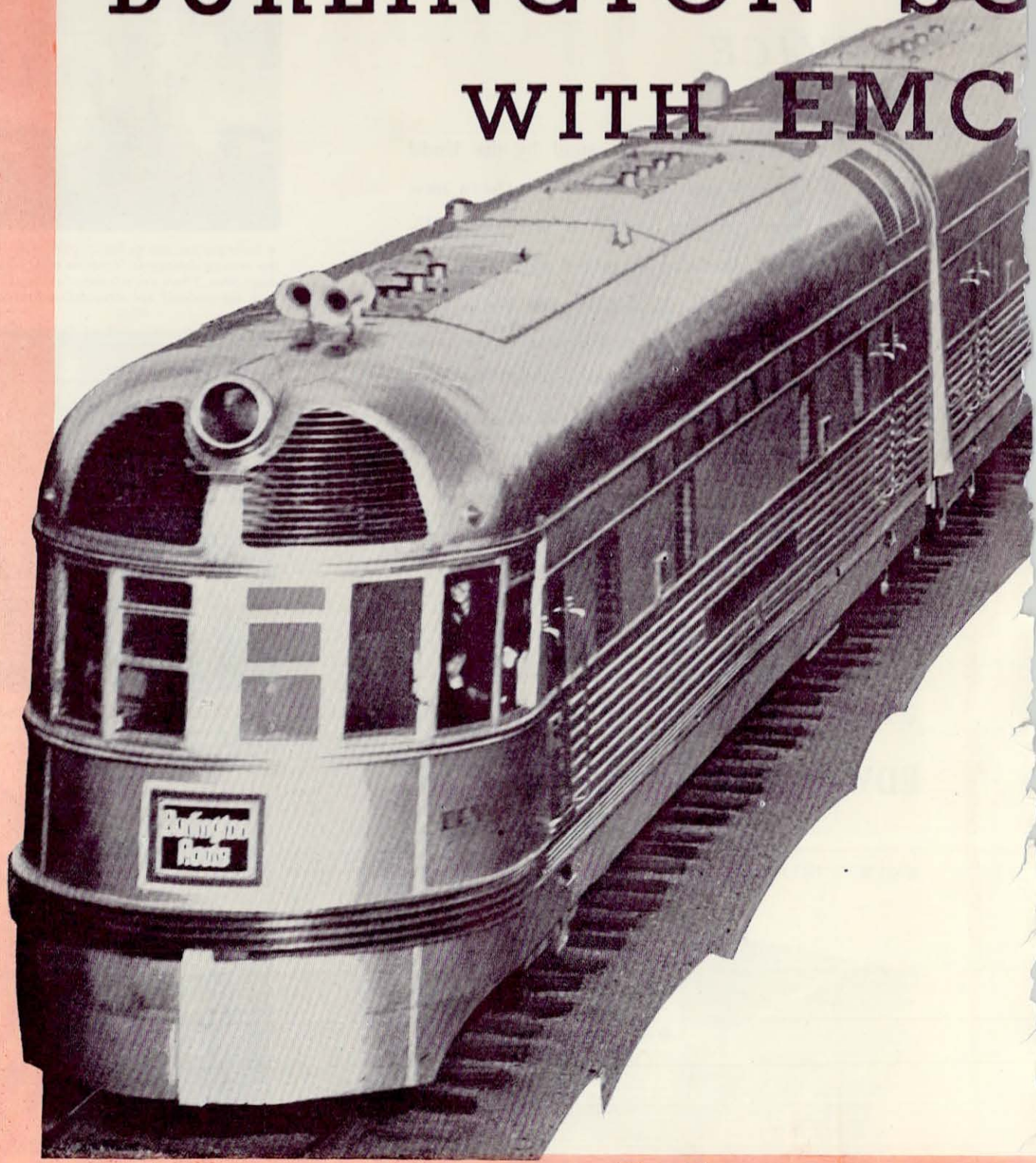
• Forty persons can be seated at ten tables in the inviting dining-car. Venetian blinds lend distinction. There are telephone connections with the cocktail and observation lounges.

• The ladies' dressing-rooms are spacious—smartly decorated. In the one above, the basins are robin-egg blue, and the chairs and sofa are upholstered in cream-colored leather.

• The gay cocktail lounge seats 34 guests. The mahogany bar is trimmed in stainless steel. Half-moon sofas and modern chairs supply seating arrangements.

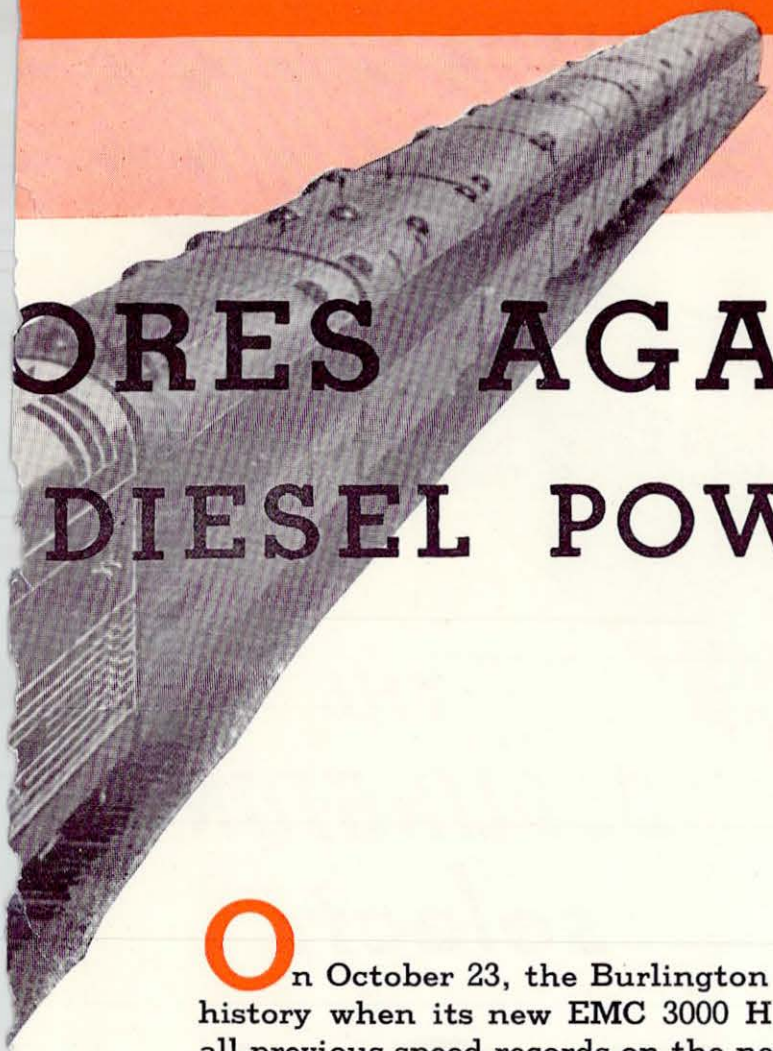
BURLINGTON SC

WITH EMC



ELECTRO-MOTIVE

SUBSIDIARY OF GENERAL MOTORS



ORES AGAIN—

DIESEL POWER!!!

On October 23, the Burlington again made transportation history when its new EMC 3000 H.P. Diesel locomotive broke all previous speed records on the new Denver Zephyr's non-stop run from Chicago to Denver. A remarkable performance—1017 miles in 12 hours, 12 minutes, 27 seconds hauling six deluxe trailers and lifting the train about one mile en route from Chicago to Denver. The average speed was 83.3 m.p.h. and the top speed 116 m.p.h.—fuel oil consumption only 1.5 gallons per mile.

This unprecedented performance was more than a record-breaking run—it was an outstanding demonstration of fast and economical operation without any sacrifice of comfort or safety.

Electro-Motive Corporation is proud to have supplied the complete 3000 H.P. Diesel locomotive which made possible this record-breaking achievement.

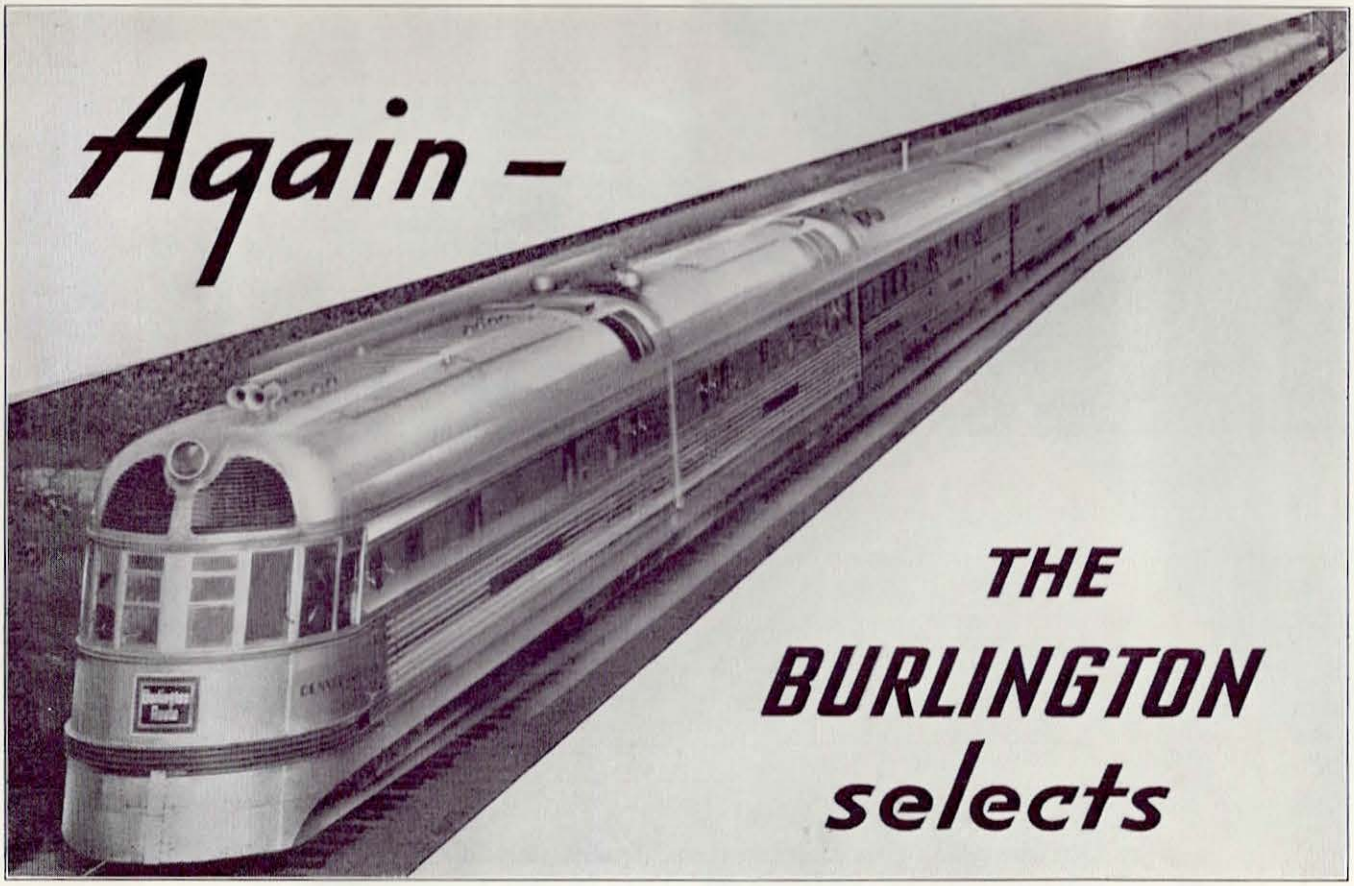
On November 8th the Burlington will place the new Denver Zephyrs in regular service between Chicago and Denver on a 16 hour schedule, which means a reduction of approximately 42% over the former steam schedule—an easy job for EMC Diesel Power.

CORPORATION

LA GRANGE, ILLINOIS, U. S. A.

EMC Economical Power for Rail Transportation EMC

• DENVER ZEPHYRS •



ALFOL

Pat. in 34 countries

The Modern, Scientific Insulation

Railroads That Use ALFOL

Alton & Southern Railroad
The Atchison Topeka & Santa Fe Railway
Baltimore & Ohio Railroad System
Brooklyn Manhattan Transit Corp.
Canadian Pacific Railroad
Chicago, Burlington & Quincy Railroad Co.
Delaware & Hudson Railroad Corp.
Erie Railroad Co.
L. C. L. Container Corp.
Merchants Despatch, Inc.
New York Central Railroad Co.
The New York, New Haven & Hartford Railroad Co.
The Pennsylvania Railroad
Pullman Company
Southern Pacific Lines
Texas & Pacific Railway Company
Union Pacific System
Wabash Railway Co.
Western Fruit Express Co.
Norfolk & Western Railway
Pacific Fruit Express Co.

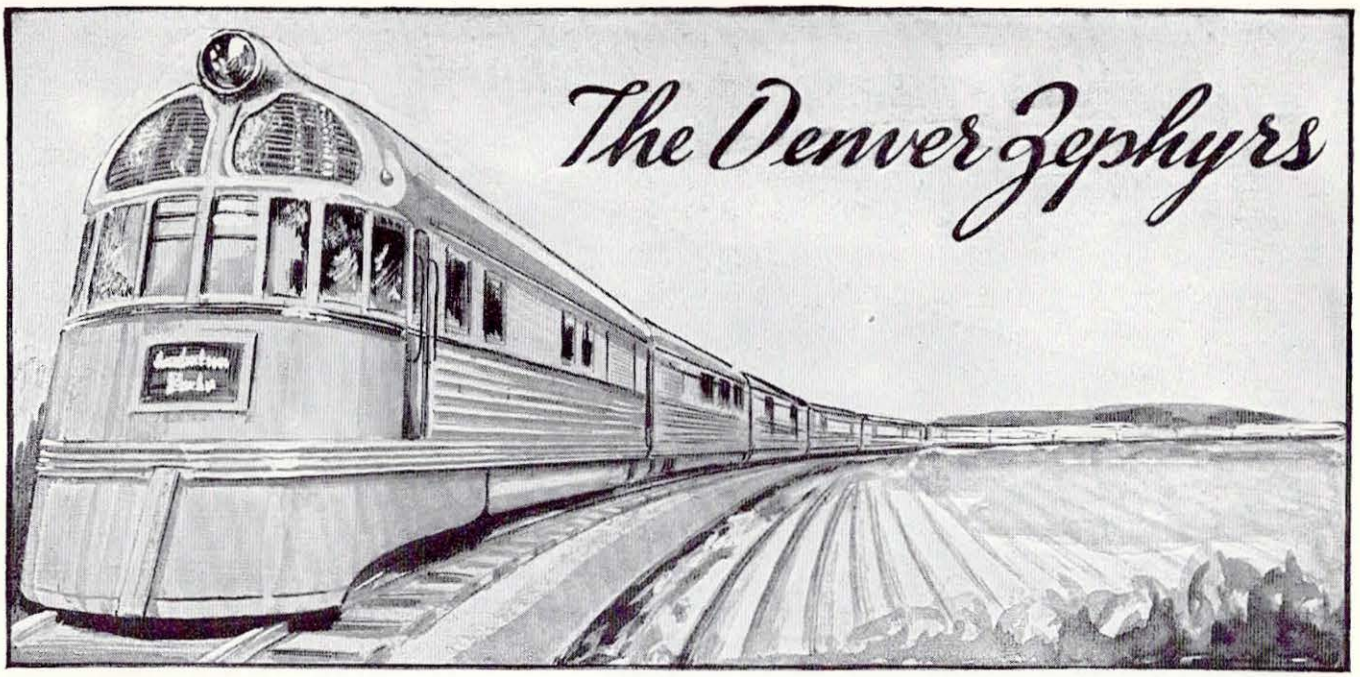
Repeat orders from the Burlington and many other railroads are irrefutable evidence that ALFOL meets all demands for railway car insulation . . . just as it has been doing for more than ten consecutive years, here and abroad.

More and more, progressive car designers, alert to modern improvements, are specifying ALFOL. It has many outstanding advantages. It's the lightest insulation known, thus reducing dead-load hauling costs. It occupies minimum space. ALFOL has practically no heat-storage capacity thereby permitting quick pre-cooling at low cost; withstands vibrations without disintegrating or coming loose, and can be installed in any part of any car on flat or curved surfaces.

Through long experience with railroad installations, ALFOL Engineers are thoroughly qualified to solve your insulation problems. Consult us regarding your particular requirements. We will be glad to be of service at any time.

ALFOL INSULATION COMPANY, Inc.
CHRYSLER BUILDING NEW YORK, N. Y.

• DENVER ZEPHYRS •



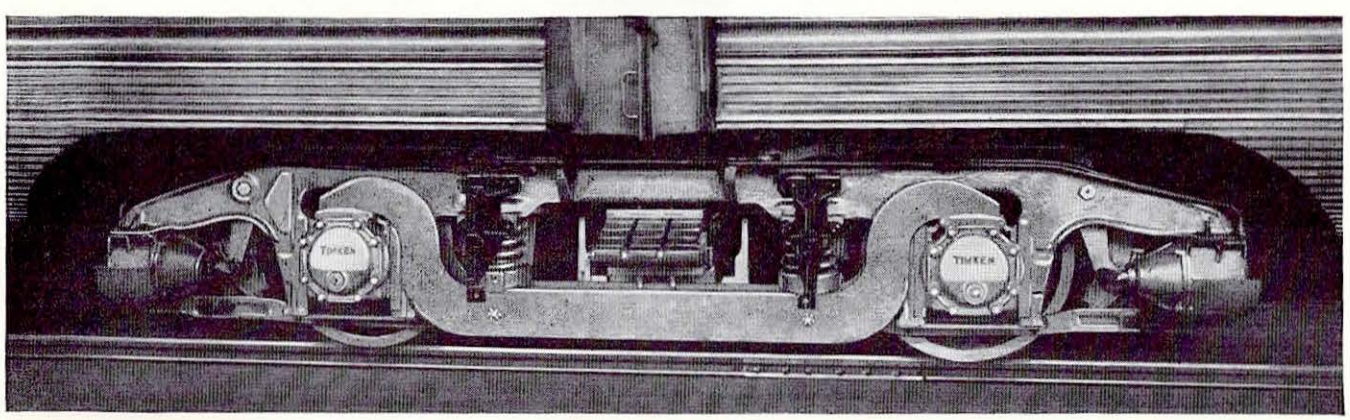
Ride Safely and Smoothly
on Commonwealth Trucks

All BURLINGTON ZEPHYRS now in operation, including the new DENVER ZEPHYRS, are equipped with COMMONWEALTH type motor and trailer trucks. The articulated cars are also equipped with Commonwealth one-piece end sills with center plate integral and articulated side bearing arrangement.

The truck frames, bolsters and other parts, made of special alloy cast steel, are of light weight design for high speed service. The truck frames are cast in one piece, including all cross members, providing strong, durable construction and reducing the number of parts and maintenance costs to a minimum.

GENERAL STEEL CASTINGS

Granite City, Ill. Eddystone, Pa.



• DENVER ZEPHYRS •

Again!

"Vapor" Equipment

- STEAM GENERATING UNITS—twin installation
- END TRAIN PIPE VALVES
- FLEXIBLE METALLIC CONDUITS between End Valves and Automatic Connectors
- AIR CONDITIONING CONTROLS AND THERMOSTATS
- THERMOSTATIC CONTROL FLOOR HEATING for individual Rooms and Compartments
- COPPER FIN-TYPE RADIATION
- WASH-WATER HEATING equipment including automatic Mixing Valve

All Streamline High Speed Trains Use Vapor Equipment

VAPOR CAR HEATING CO., INC.

RAILWAY EXCHANGE — CHICAGO, ILLINOIS

Heywood-Wakefield seats the Denver Zephyr!

THAT masterpiece of modern engineering . . . Budd's Denver Zephyr for the C. B. & Q. . . . will be fitted throughout with Heywood-Wakefield seating. Not only will the coaches use H-W chairs, but berths and mattresses in the sleeping compartments were built to specifications in our Gardner, Mass. plant. The two original Zephyrs are using H-W seats. The Pennsylvania . . . U. P. . . . Northwestern . . . Canadian Pacific . . . Santa Fe . . . New Haven . . . N. Y. Central . . . and a score of other famous roads have specified Heywood-Wakefield seating. They have done so because they know that these smart, modern, scientific seats will be styled up to the minute . . . built for comfort that will wear throughout the years. Ask your H-W Sales representative to explain some of his new streamline styles to you and to demonstrate why this modern seating has helped many roads solve present day seating problems.

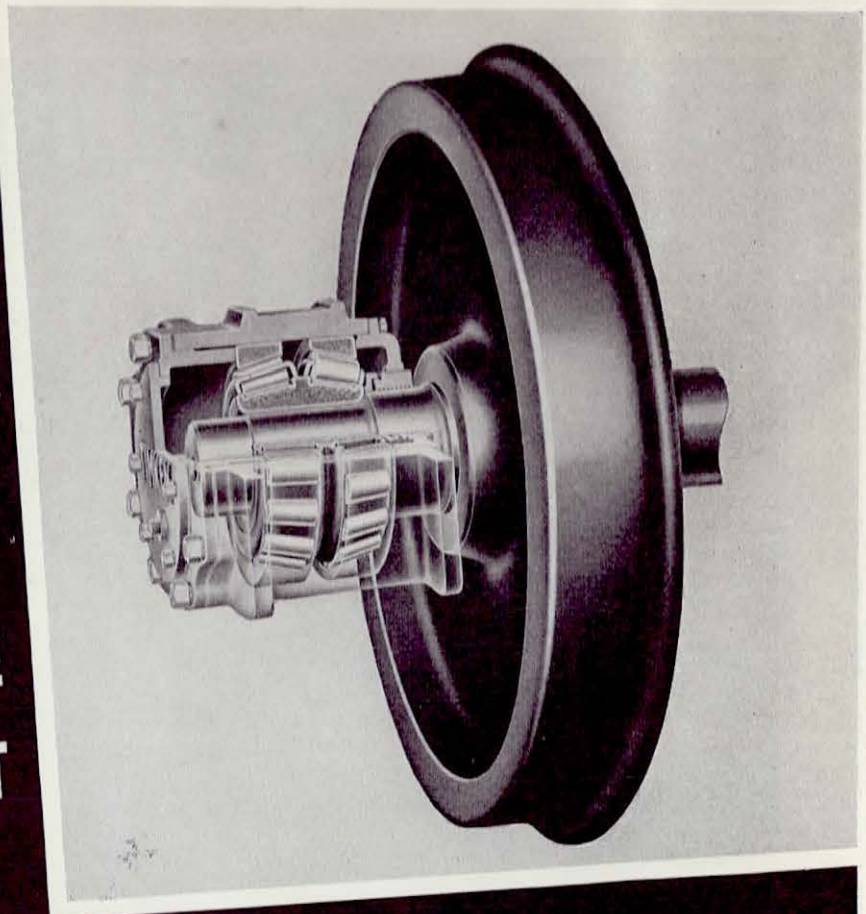
HEYWOOD-WAKEFIELD

ESTABLISHED 1826

General Offices . . . GARDNER, MASS.

Seating FOR *Every Type* OF *Transportation*

• DENVER ZEPHYRS •



★

THE ENTIRE "ZEPHYR" FLEET IS TIMKEN-EQUIPPED

Timken Bearings are used in all journals of the Burlington "Zephyrs"—including the four streamliners already in operation and the four new trains about to go into service.

Ever since the first "Zephyr" took the rails, Timken Bearings have played an important part in all record-making "Zephyr" performances. They will have an even greater opportunity to display their efficiency, endurance and economy when the new "Zephyrs" set forth for further conquests of time and distance. As a result of Timken Bearing performance in the "Zephyrs" and other pioneer streamliners, most of the new streamlined trains and locomotives are Timken-equipped. This is something to consider when building new trains or equipment of any type.

AND AS WE GO TO PRESS

the new "Denver-Zephyr" breaks another world record between Chicago and Denver, making the entire run—non-stop—in 12 hours, 12 minutes, 27 seconds—an average speed of 83.6 miles per hour for the 1,017 miles.

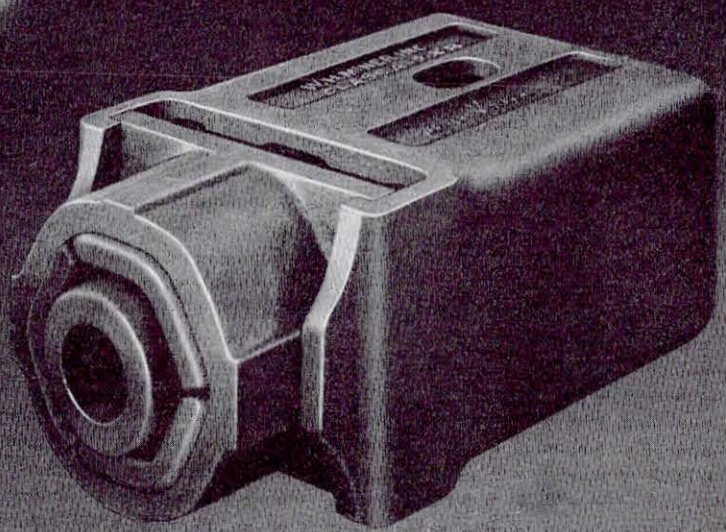
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *TAPERED ROLLER* **BEARINGS**

the new Burlington Denver Zephyr is equipped with

MINER

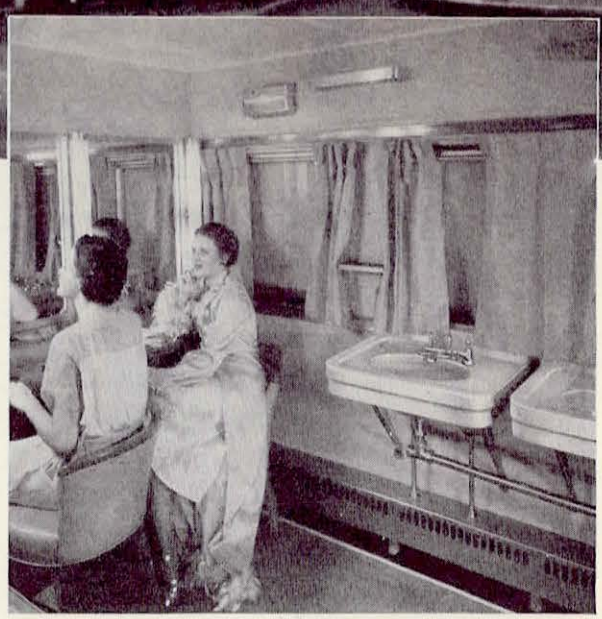
FRICTION DRAFT GEAR



W. H. MINER, INC. CHICAGO

• DENVER ZEPHYRS •

CRANE FIXTURES Break Records with NEW *Zephyrs*



WHEN the public saw the 88 new Crane railroad lavatories aboard the new Burlington Zephyrs, its impression of sleek, streamlined beauty was complete! Colorful, lightweight, convenient and beautiful in appearance—these Crane lavatories are typical of the whole Crane line of railroad plumbing fixtures for lightweight trains.

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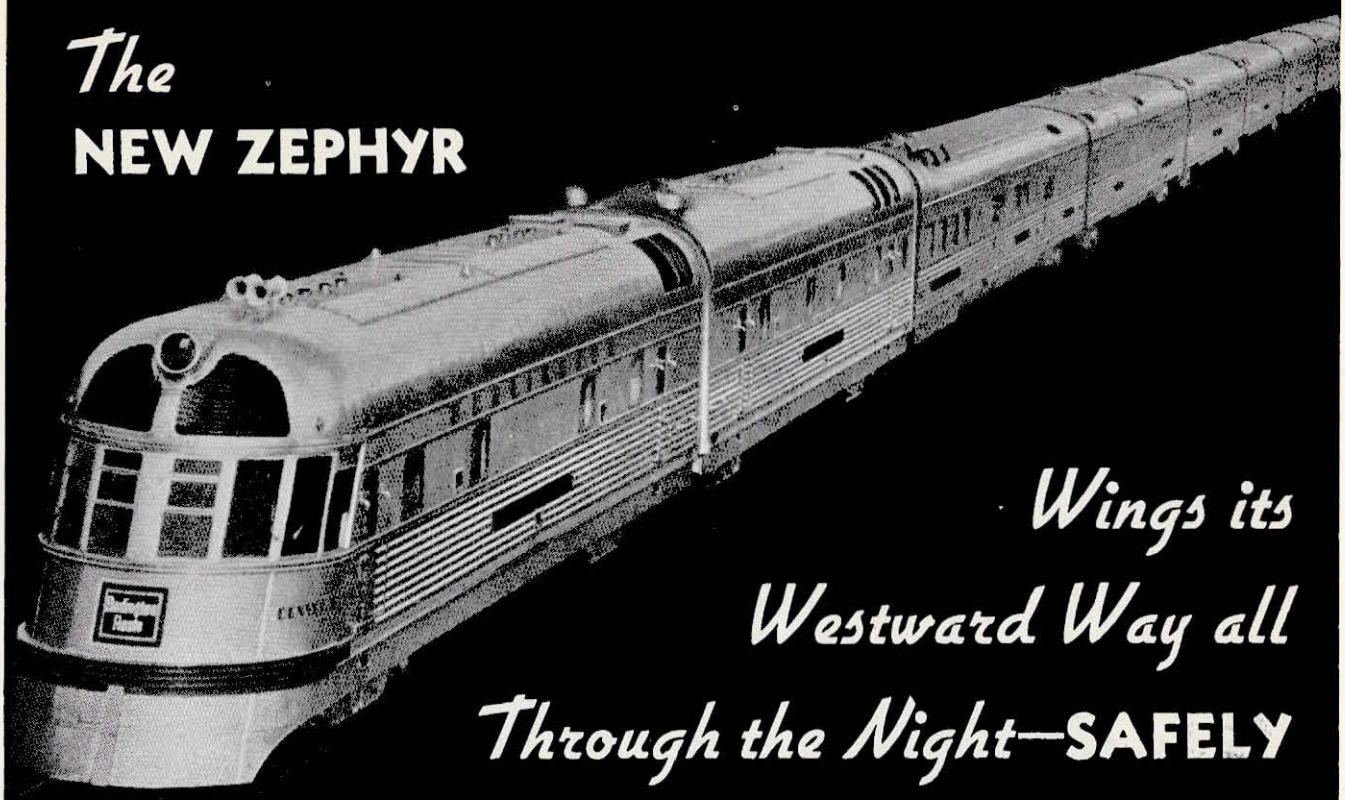
The
NEW ZEPHYR



*Wings its Westward Way all Through the Night—***SAFELY**

FLASHING through black darkness like a silver streak, the new Burlington Zephyr speeds over-night passengers from Chicago to Denver—SAFELY. Midway it passes its companion train on the return trip . . . Supplementing a fleet already rendering noteworthy service at various points on the Burlington Lines, these ten-car trains are of the latest streamlined construction, providing distinctive accommodations in parlor cars, coaches, and sleeping cars . . . The swift operation of these nightly carriers is safeguarded by Westinghouse Air Brakes, the improved HSC Equipment—highly efficient and effective.

WESTINGHOUSE AIR BRAKE CO.

GENERAL OFFICE AND WORKS . . . . WILMERDING, PA.

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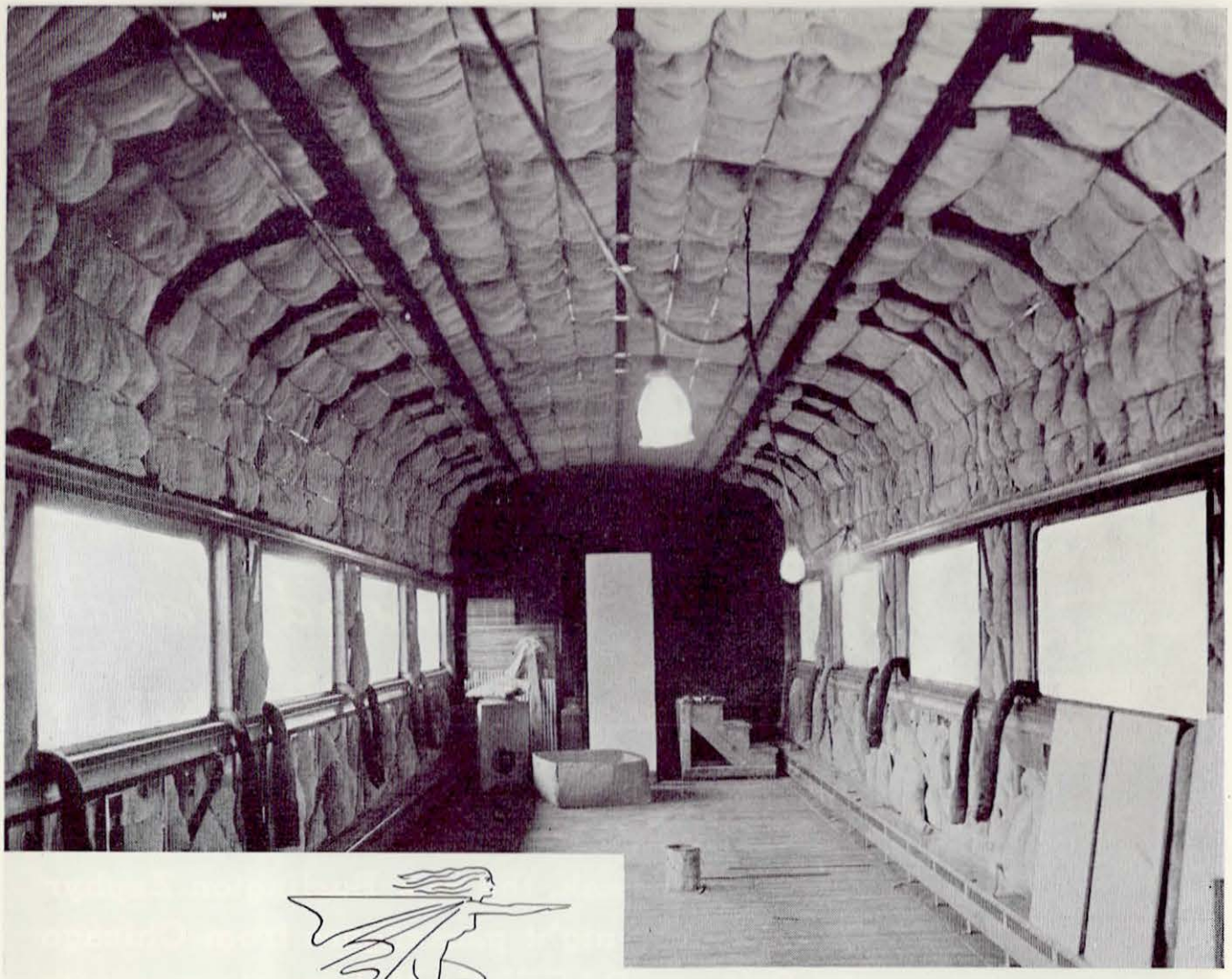

The New Burlington Zephyrs

With a background of practical experience in building and operating the high speed Zephyrs, the Edward G. Budd Co. and the Burlington Railroad have insulated and sound deadened the new Denver trains with Dry-Zero Hi-Speed Blanket.

HAIRINSUL — Standard refrigerator car insulation.

DRY-ZERO — The most efficient and lightest weight low temperature insulation known — standard for low temperature cars.

SALAMANDER — For over 30 years the standard insulation for passenger cars.

LIGHT-WEIGHT SALAMANDER — For insulating light-weight, high speed passenger cars.

CARINSUL — Made especially for insulating the letter board of passenger cars.

OZITE STANDARD HAIR FELT — Made by the genuine original platen or felted process and universally recognized as the highest standard of felted insulation.

LIGHT-WEIGHT AIR CONDITIONING HAIR FELT — For insulating air ducts.

DRY-ZERO ECONOMY ICE BLANKET — For reducing ice meltage on platforms and in transit.

AMERICAN HAIR & FELT COMPANY • DRY-ZERO CORPORATION

(Railroad Division)

Merchandise Mart Chicago

• DENVER ZEPHYRS •

OKONITE

The dependability of Okonite has contributed to the safe operation and adherence to schedules of many railroads. The Chicago Burlington and Quincy Railroad has wired the cars of their Zephyrs with Okonite Car Wire because of its dependability. Okonite insulation is dependable, but it also renders a long and useful life.

THE OKONITE COMPANY

Founded 1878

HAZARD INSULATED WIRE WORKS DIVISION

THE OKONITE-CALLENDER CABLE COMPANY, INC.

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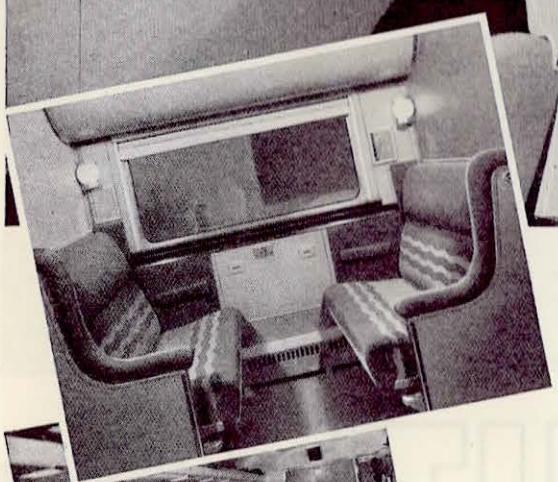
BURLINGTON *again chooses* DUNLOPILLO CUSHIONING

• *Passengers ride in fresh, relaxed comfort. No springs or padding to collect dust, get bumpy or wear out.*



• *Close-up view showing modern style and lines of Zephyr Pullman seats. Seats, backs, headrests and mattresses — all completely Dunlopillo cushioned.*

• *Dunlopillo cushioned seats in day coaches soak up vibration, eliminate travel fatigue.*

Famous cushioning material selected for four new BURLINGTON "ZEPHYRS"

Another glowing tribute to Dunlopillo cushioning. Now—after having been thoroughly proved in millions of miles of actual service on the original Burlington Zephyrs—this marvelous cushioning material has again been chosen for use on Burlington's newest trains. Seven years proved commercial experience approve this decision. Here is cushioning material that absorbs shocks yet provides a firm, restful support for the body. It is proved cool . . . clean . . . and odorless. And engineers have found its use greatly lowers maintenance cost. In comfort to the passenger . . . in operating economy to the road . . . Dunlopillo cushioning stands undisputed *first*. Write for full description and information today.

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(REG. U. S. PATENT OFFICE)

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• DENVER ZEPHYRS •

A New

HEADLIGHT CASE

for the

Denver Zephyrs

Designed by Pyle-National engineers for the requirements of the new Zephyrs, this headlight case is mounted in the power car roof and is completely accessible from within for cleaning, adjustment, or relamping. The front door glass is hinged and swings in, above the cab, for cleaning of the outside. The reflector is mounted in a 3-point spring suspension, protecting both reflector and lamp against shock and vibration, and providing for simple, accurate alignment.

Pyle-National standard and special headlighting equipment is available to meet every requirement of modern high speed services.

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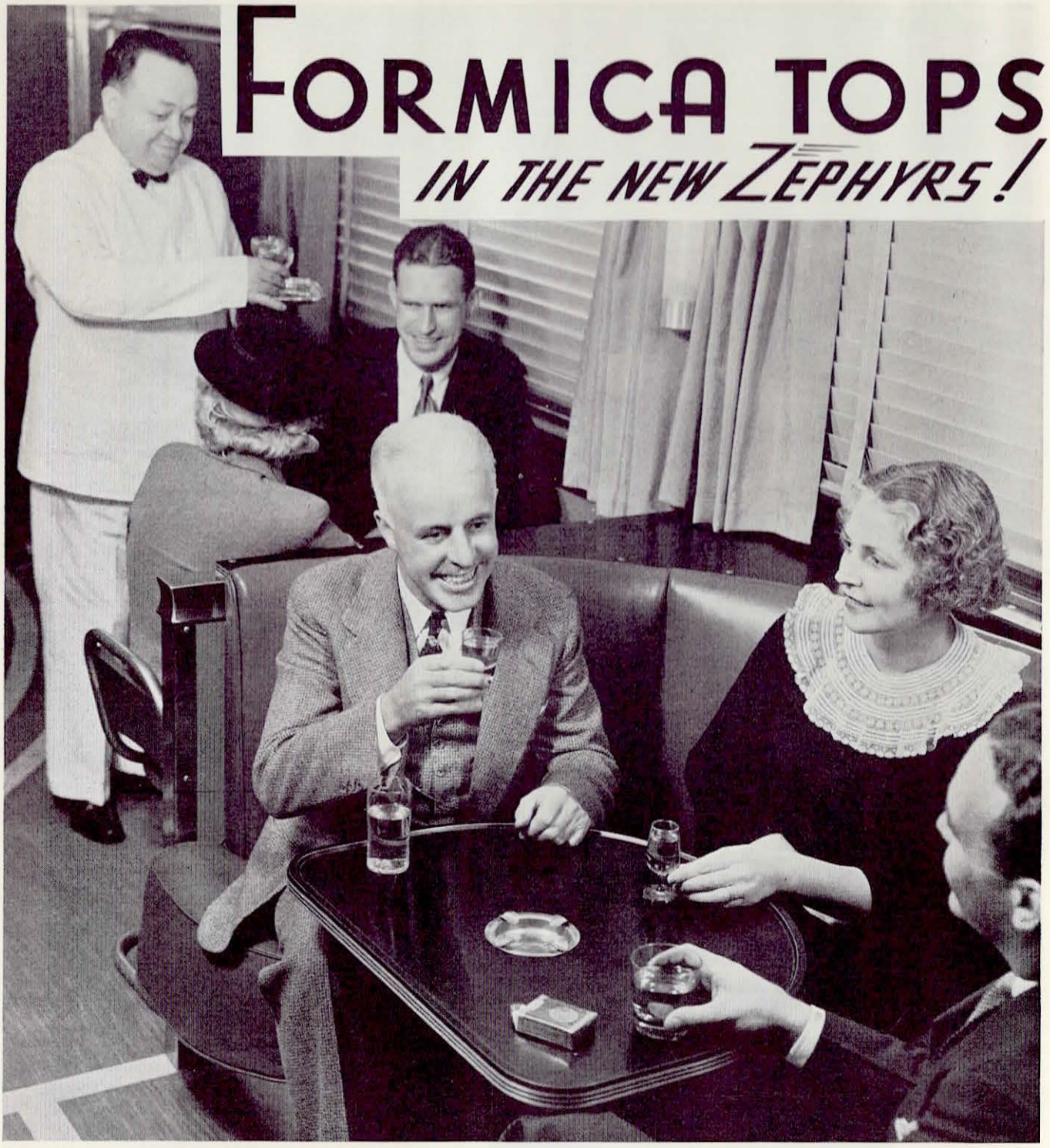
HEADLIGHTS • TURBO-GENERATORS • CONDUIT FITTINGS

The Pyle-National Company, 1334-58 North Kostner Avenue, Chicago, Ill.
Offices: New York, Baltimore, Pittsburgh, St. Louis, St. Paul, San Francisco • *Export Department:* International Railway Supply Co., New York • *Canadian Agents:* The Holden Co., Ltd.

RECOGNIZED LEADERSHIP • WIDEST EXPERIENCE • FOR OVER 38 YEA

FORMICA TOPS
IN THE NEW ZEPHYRS!



IN the new Zephyr trains built for the Burlington Railroad by Budd Formica was again used for table tops as it was in the original Zephyrs.

In most of the fine new trains that have gone on the rails during the past few years Formica has been used not only for table tops but for shelving in the lavatories, bucket seat linings, window capping and for many other uses.

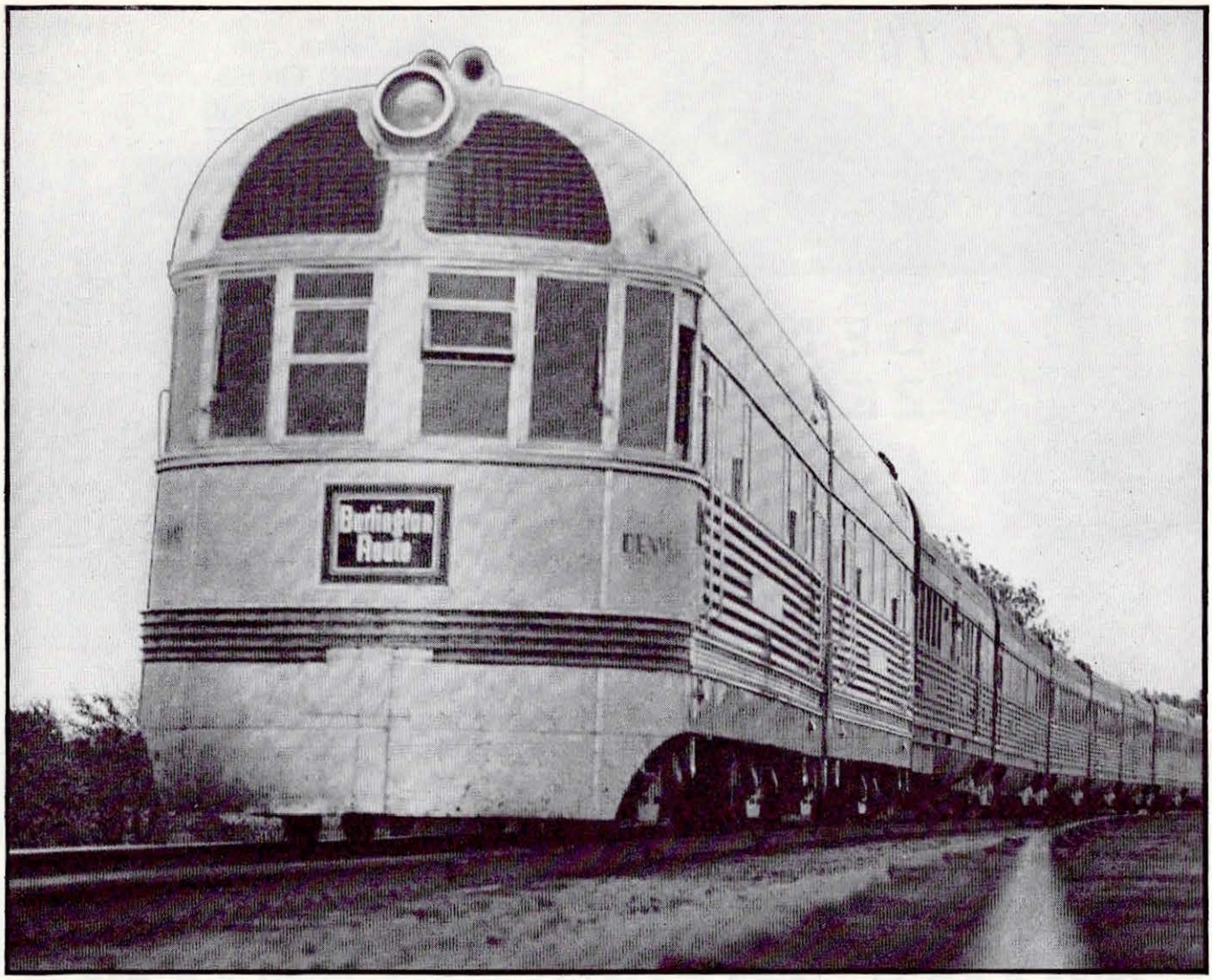
Formica stands the service and remains attractive without refinishing or maintenance.

FORMICA

The Formica Insulation Co. · · 4641 Spring Grove Avenue, Cincinnati, Ohio

FOR FURNITURE AND FIXTURES

• DENVER ZEPHYRS •



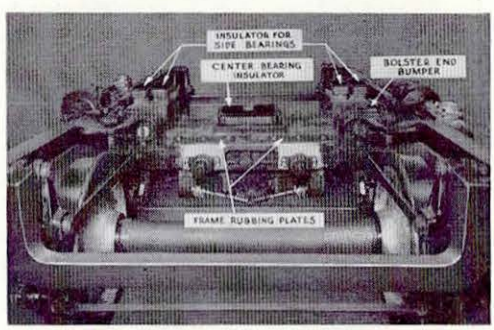
Good-bye "CLICKETY-CLACK!"

Budd and The Burlington Subdue Noise with Cushioned Rides on U. S. Rubber

Evidence of the genius of Edward G. Budd Mfg. Co. and the foresight of the Burlington Route, the streamline "Zephyrs" of stainless steel flash across railroading's new horizon—swiftly, safely, silently, comfortably

Insulated against sound with pads of U. S. Rubber bonded to steel, the trucks of the "Zephyrs" transmit a minimum of noise to the cars. Thanks to the research of U. S. Rubber engineers, rubber parts are now permanently joined to steel, taking up shock, preventing metallic contact, eliminating noise, giving a smooth, floating ride

U. S. Rubber is an accredited source for "Zephyrs' " rubber parts, custom built and engineered for each job. U. S. Rubber is proud to join in contributing to the advancement of transportation.

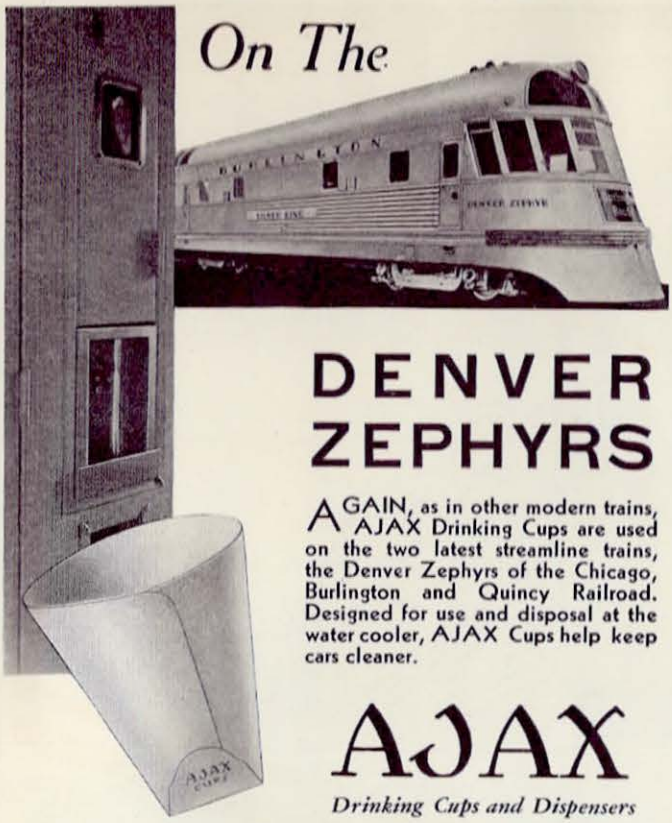


Diagrammatic view of a "Zephyr" truck showing the placement of U. S. Rubber insulating parts. Rubber pads bonded to steel-attaching plates prevent metallic impact and minimize transmission of sound.

United States Rubber Company

United States Rubber Products, Inc., New York, N. Y.

• DENVER ZEPHYRS •



DENVER ZEPHYRS

AGAIN, as in other modern trains, AJAX Drinking Cups are used on the two latest streamline trains, the Denver Zephyrs of the Chicago, Burlington and Quincy Railroad. Designed for use and disposal at the water cooler, AJAX Cups help keep cars cleaner.

AJAX

Drinking Cups and Dispensers

LOGAN DRINKING CUP CO., DIV.
68 Prescott St., Worcester, Mass.
Pacific Coast Envelope Co., San Francisco, Calif.
DIVISIONS OF U. S. ENVELOPE COMPANY

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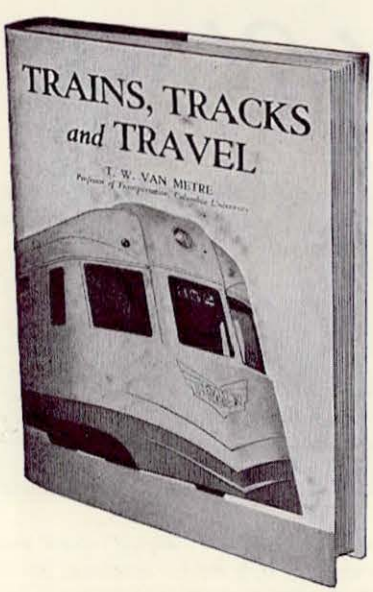

By T. W. VAN METRE

Professor of Transportation, Columbia University

A new edition of this popular elementary book on railroading is just off the press. It has been thoroughly revised and obsolete illustrations have been replaced to show latest equipment. There is a new chapter on streamlined trains and additions to others cover recent developments in air conditioning, air brakes and Diesel and electric locomotives.

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Our Steam Railroads—The Railroad Track—The Steam Locomotive—Electric Locomotives; Gasoline and Oil Motors—Freight Cars—Passenger Train Cars—Tomorrow's Trains Become Today's—Passenger Stations and Terminals—Freight Terminals—The Operation of Trains.

306 Pages, 276 illustrations, 6½ x 9½, cloth binding, $3.00.

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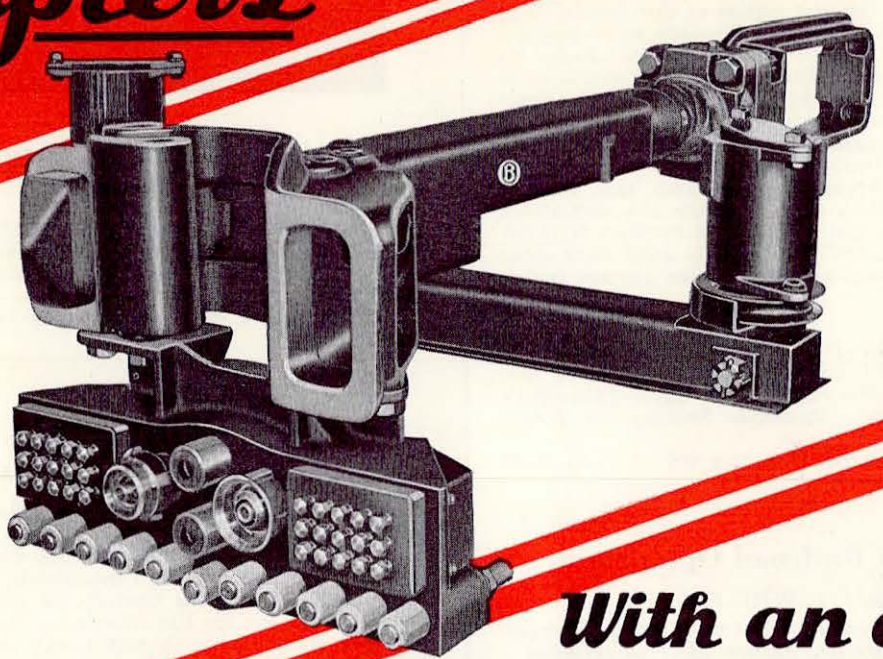
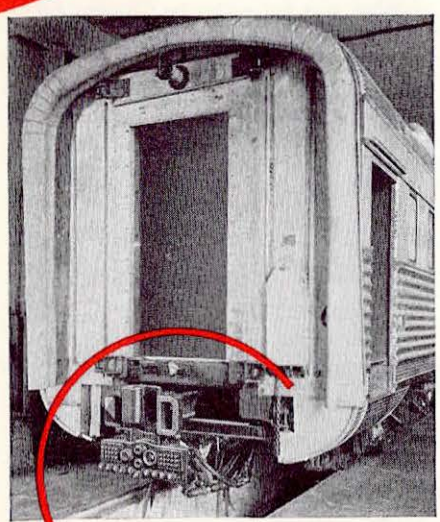
• DENVER ZEPHYRS •

The BURLINGTON Chooses O-B Tight-Lock Couplers



With an eye to GREATER PASSENGER COMFORT and REVENUE



ANOTHER great name, the Burlington, is added to the impressive list of railroads which have chosen O-B Automatic Tight-Lock Couplers and Train Line Connectors. Only because this equipment contributes materially to increased comfort, safety and operating economy has it been chosen by so many of the railroads which are making a strong bid for more of the public's transportation dollar.

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By T. W. VAN METRE

Professor of Transportation, Columbia University

The new edition of this popular book on railroads describes latest practice. There is a complete new chapter on streamlined trains and additions to others covering the new developments in air brakes, air conditioning of passenger cars and in high-speed Diesel and electric locomotives. Among the numerous new illustrations are shown the new streamlined trains. This is an excellent book for a boy who wants to know more about railroads and for the average reader.

Contents

Our Steam Railroads—The Railroad Track—The Steam Locomotive—Electric Locomotives; Gasoline and Oil Motors—Freight Cars—Passenger Train Cars—Tomorrow's Trains Become Today's—Passenger Stations and Terminals—The Operation of Trains.

1936. 4th. 312 pages, 276 illus., 7 x 9½ in., cloth, $3.00

Analysis of Railroad Operations

By J. L. WHITE

Formerly Assistant Comptroller, United States Railroad Administration; Director, Section of Transportation Service—Federal Co-ordinator of Transportation

Without going into the details of accounting procedure, Mr. White clearly explains the accepted method of analyzing and interpreting railroad statistical data. He describes how the figures produced in accounting departments should be used in the study of railroad operating results; how these figures reflect the various activities of the railroad and its efficient or inefficient operation as a whole or in any of its departments.

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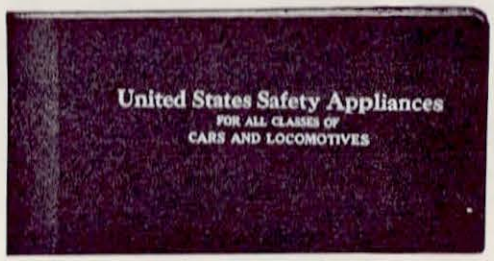

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A fascinating human interest story of the early American and Canadian railroads and of the men who built and ran them. The author, an old railroad man, tells of the beginnings of the Erie, the Pennsylvania, the Baltimore and Ohio, the New York Central, the first Pacific railroad, the Santa Fe, the Rio Grande, the Canadian Pacific and other lines. It is illustrated with reproduction of wood cuts of early locomotives and railroad scenes.

1926. 4th (Centenary). 338 pages, 17 illustrations, 6 x 9 inches, cloth. $2.50

Who's Who in Railroading

The 9th Edition of what was formerly the "Biographical Directory of Railway Officials of America" is based upon a complete resurvey of the field by means of original questionnaires. Biographical sketches of some 4,000 railroad officials, equipment manufacturers, economists, members of regulatory commissions and others whose work is directly connected with the railroad industry of North America are presented. The descriptions of these leaders of the rail industry include personal information, such as their family connections and social, religious and political affiliations, as well as a complete outline of their professional careers.

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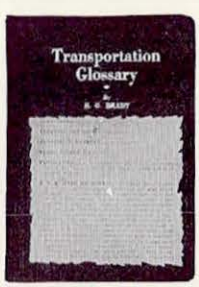
Transportation Glossary

By H. G. BRADY

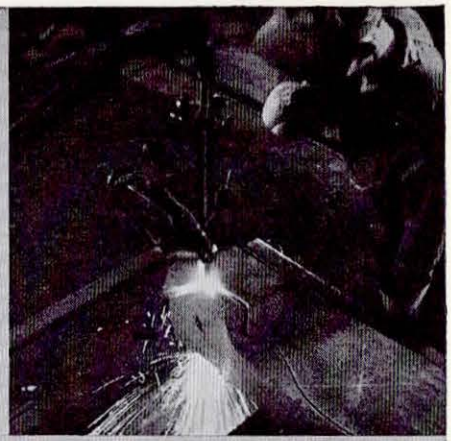


Technical and semi-technical terms, phrases and expressions in more common use in railway, highway, air and marine transportation, and in port traffic are concisely defined in this handy reference book. Ordinary dictionaries, thesauri and law book sources furnish little information on transportation terms and this book fills a long felt need. It is printed in large clear type and cross references facilitate quick tracing of desired information.

1929. 119 pages, 5 x 7 inches, flexible. $1.75

Starting to shape-cut a valve-gear connecting-rod from a forged billet.

The operator observes the progress of the oxy-acetylene cutting.



The intricate outline is formed automatically by the machine.

Shape-Cut Parts *are as sound as rolled steel*

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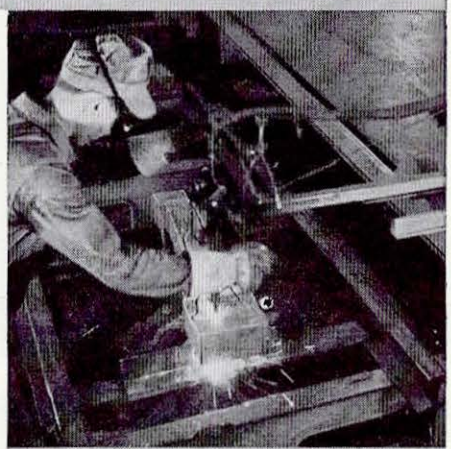
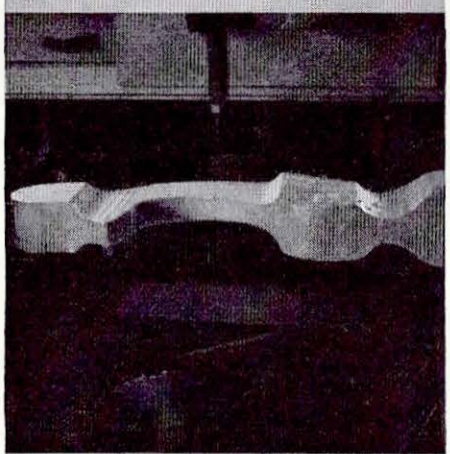
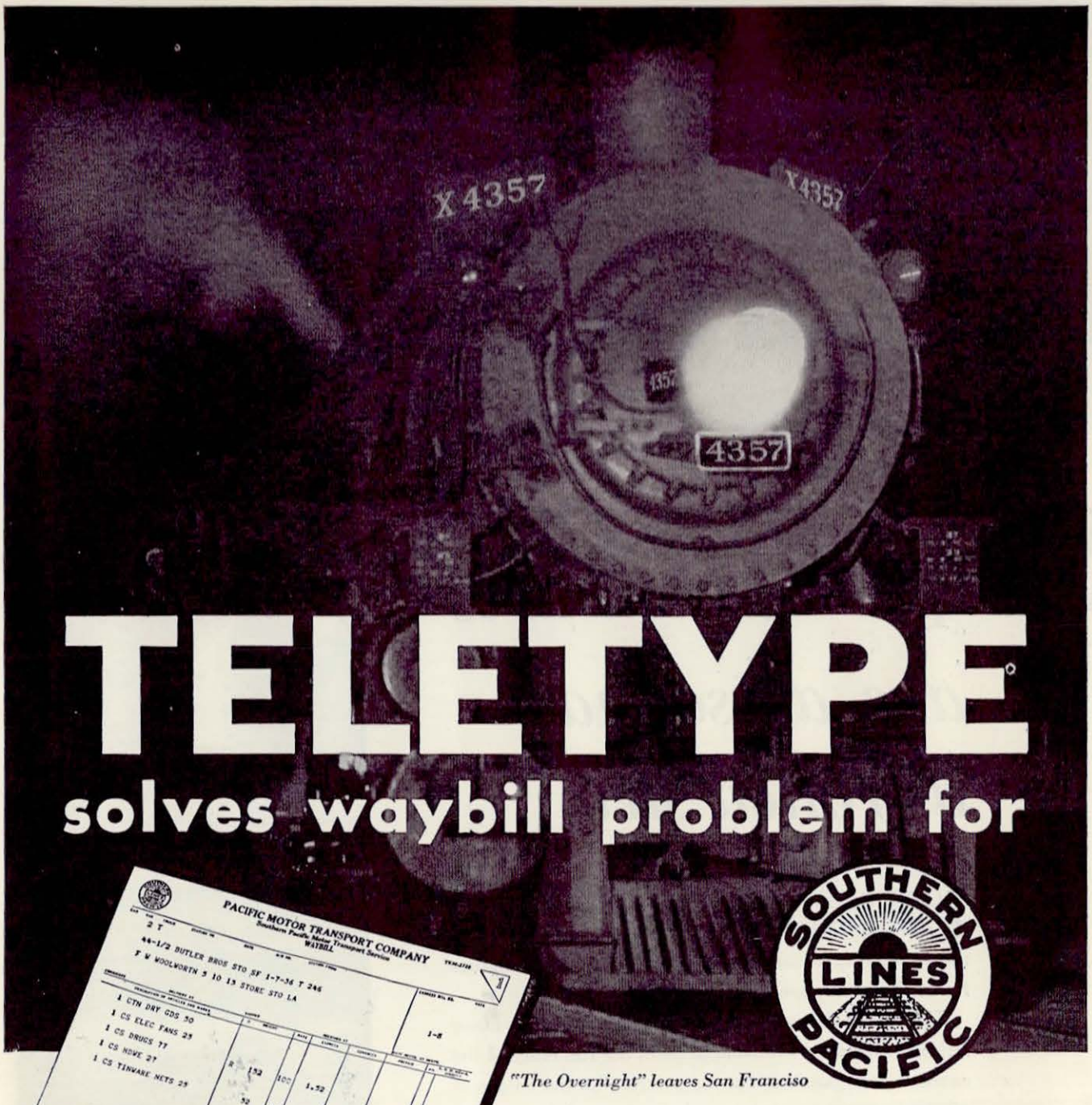


Turned on its side, the part is cut out on the opposite dimension.



The finished valve-gear connecting-rod shows the complex shape.

OXWELD
RAILROAD SERVICE



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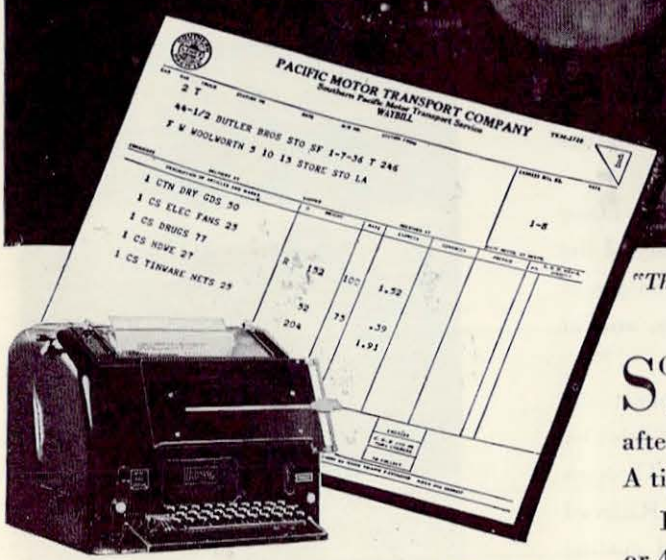
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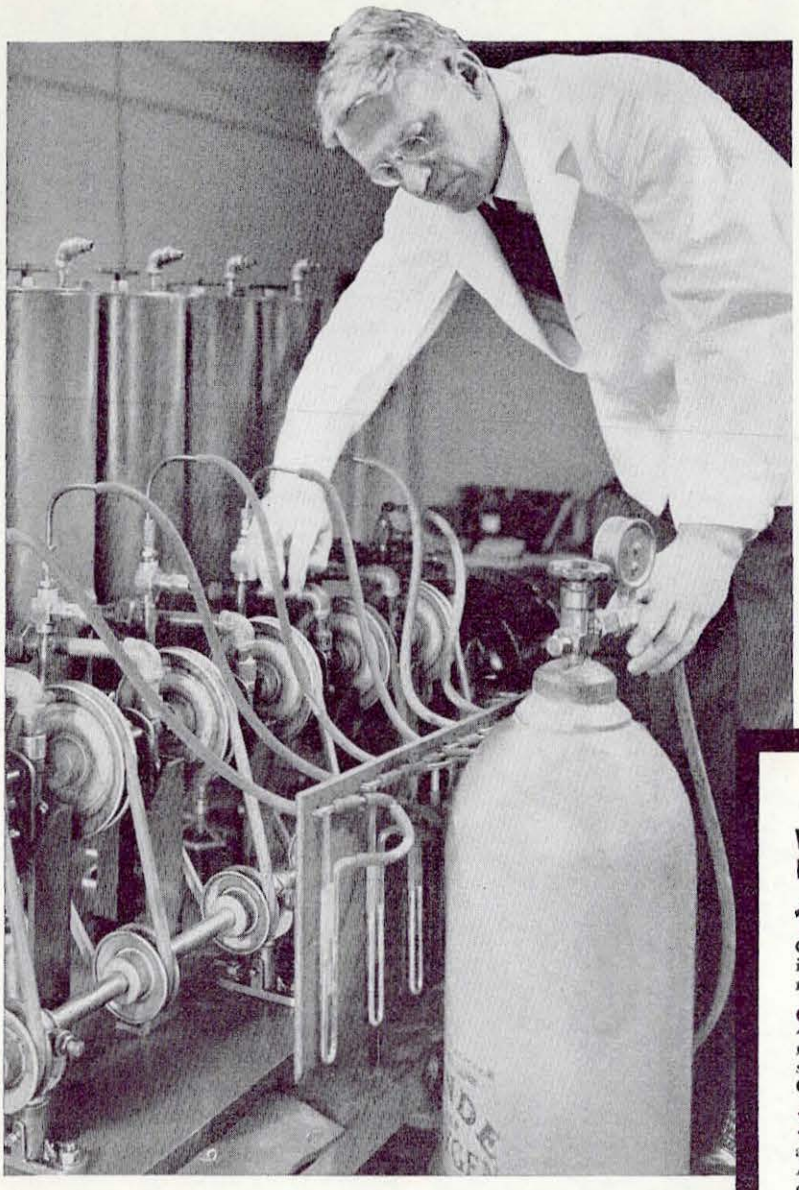
STABILITY *Proved!*

Gulfcrest Oil shows greater resistance to oxidation than any turbine lubricant tested



"100 TIMES as severe as actual service in a turbine" that is the kind of treatment this laboratory apparatus has given to scores of different turbine oils. The oil, mixed with water, is circulated rapidly with a stream of oxygen whipped thoroughly into it. Periodically an inspection for sludge and emulsification is made. No other oil has shown stability equal to Gulfcrest Oil!

From scores of power plants come reports of the unparalleled performance of Gulfcrest Oil. This turbine lubricant—made by Gulf's exclusive ALCHLOR Process—will demonstrate its value in your equipment.

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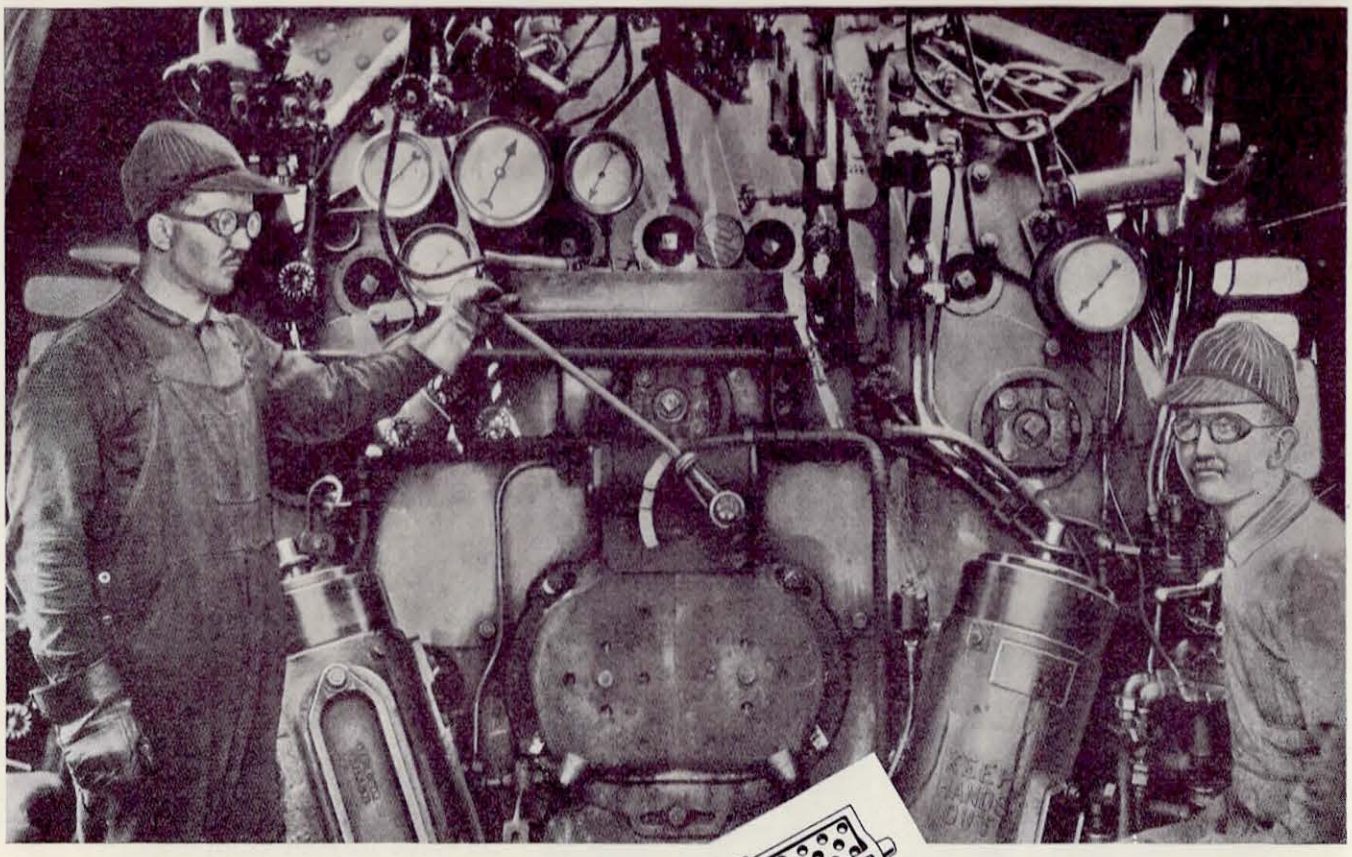
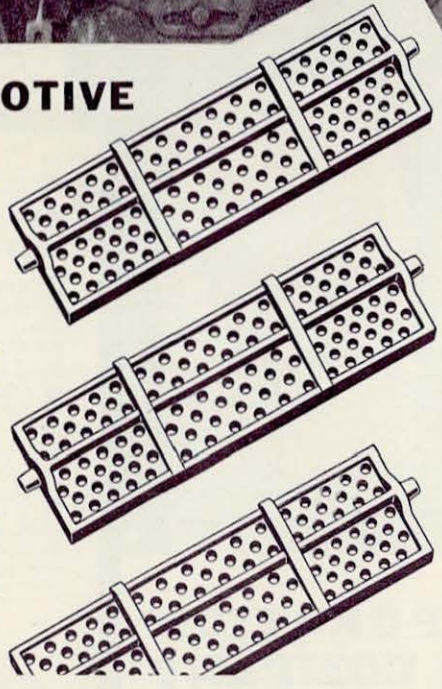
GULF INDUSTRIAL LUBRICATION

GREAT FOR GRATES



AND OTHER LOCOMOTIVE HOT SPOTS . . . .



● In order to survive the inferno in a locomotive's fire box, grate bars must be made of materials with superior stability.

The limitations of plain cast iron and steel quickly show up in oxidation, growth and warpage. But when Nickel Cast Irons are employed these difficulties are eliminated.

Additions of Nickel make cast iron highly resistant to oxidation and thermal stress, as well as to shock, abrasion and wear.

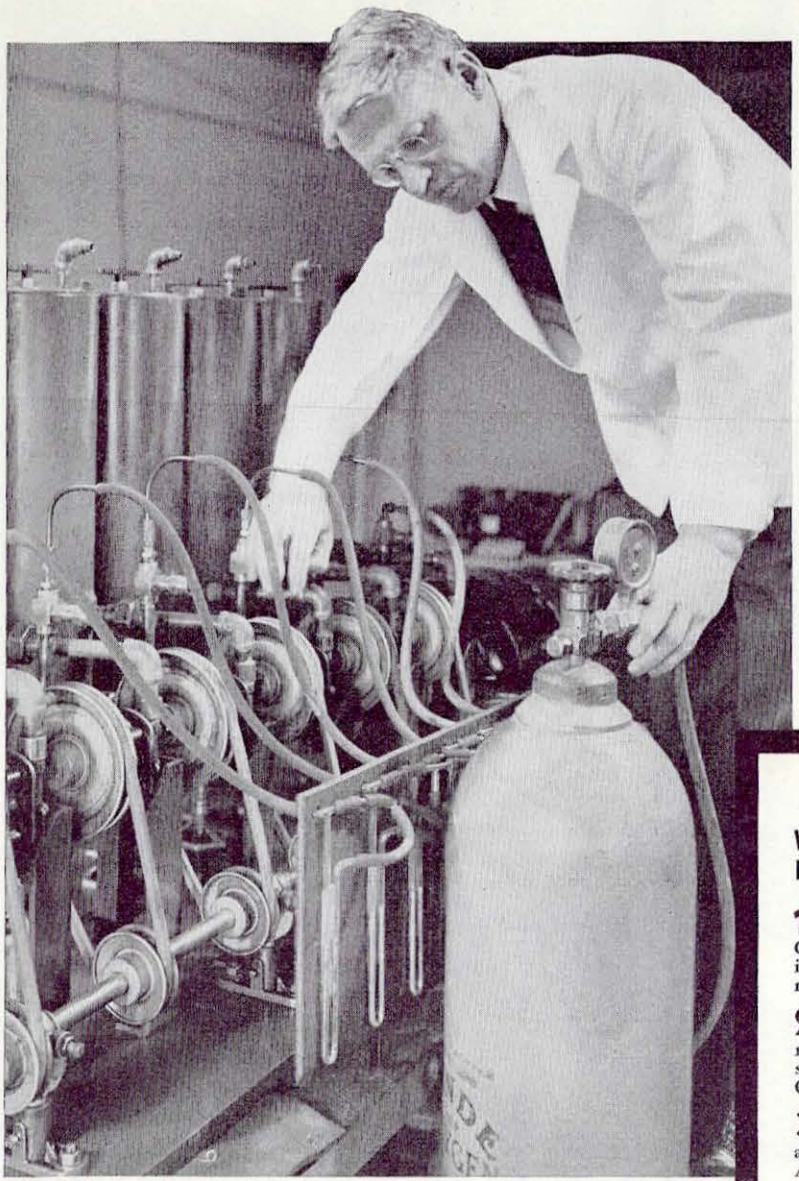
There are scores of applications where the Nickel Cast Irons, Nickel Steels and other alloys containing Nickel will lengthen service life and lower maintenance costs of your locomotives. Our engineers and casting specialists are always at your service for consultation.

ALLOY STEELS NICKEL CAST IRONS

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

STABILITY *Proved!*

Gulfcrest Oil shows greater resistance to oxidation than any turbine lubricant tested



"100 TIMES as severe as actual service in a turbine" that is the kind of treatment this laboratory apparatus has given to scores of different turbine oils. The oil, mixed with water, is circulated rapidly with a stream of oxygen whipped thoroughly into it. Periodically an inspection for sludge and emulsification is made. No other oil has shown stability equal to Gulfcrest Oil!

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4 REASONS . . .
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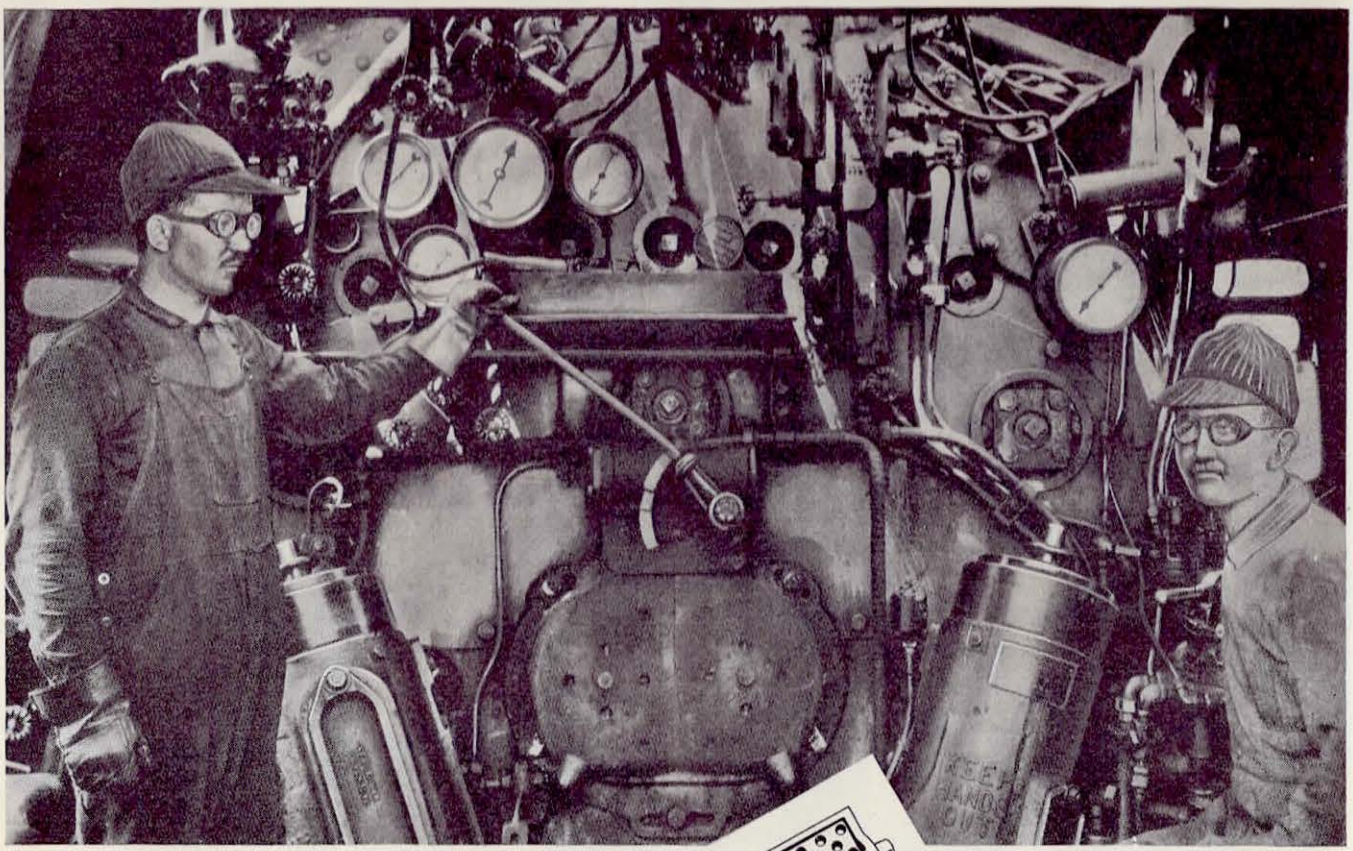
GULF INDUSTRIAL LUBRICATION

GREAT FOR GRATES



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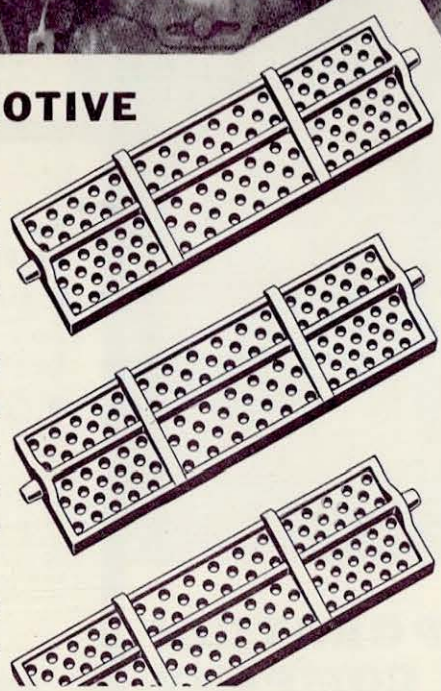

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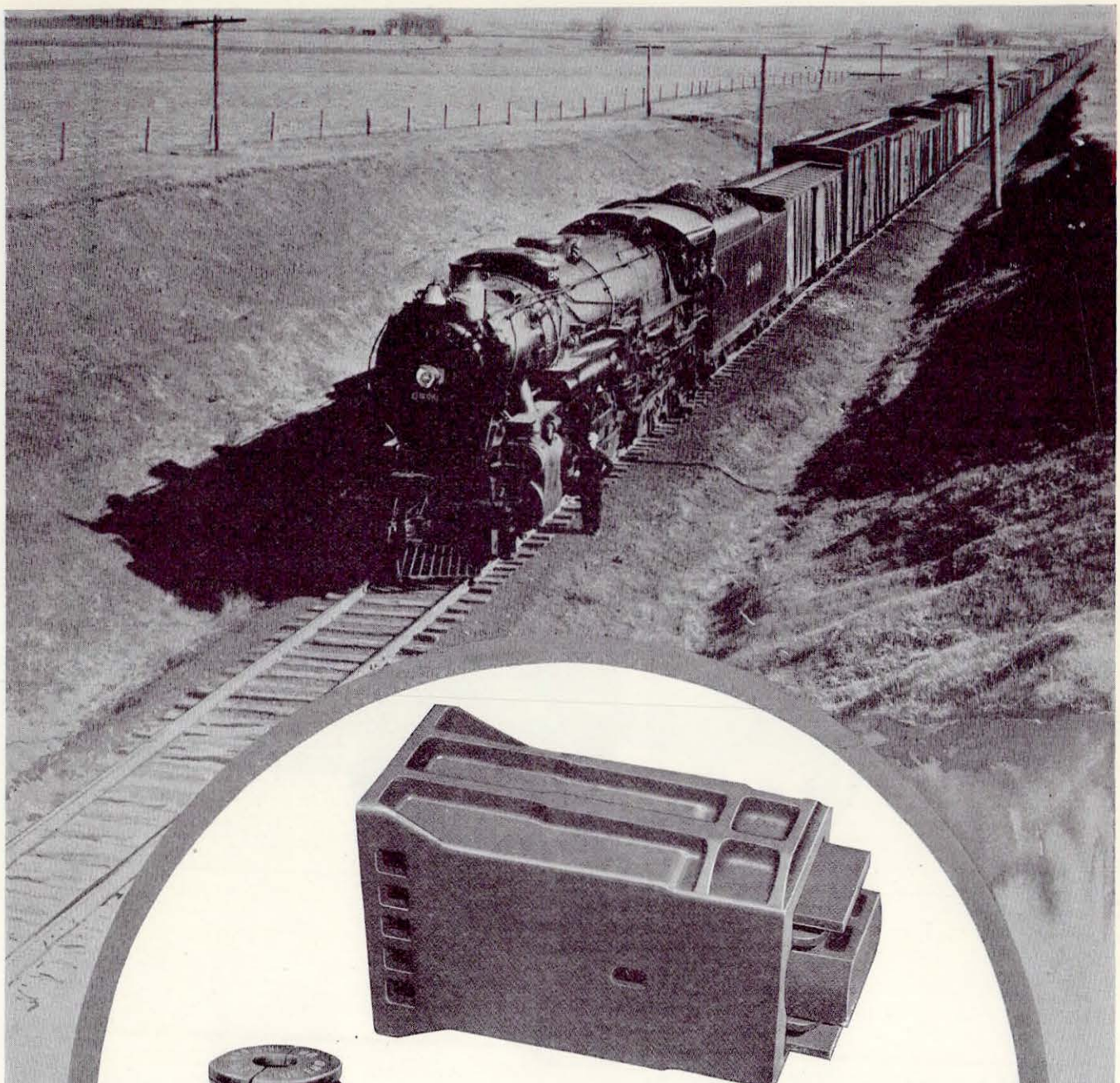

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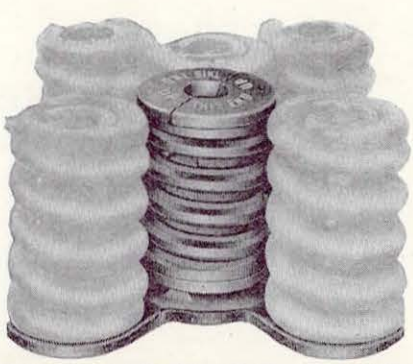

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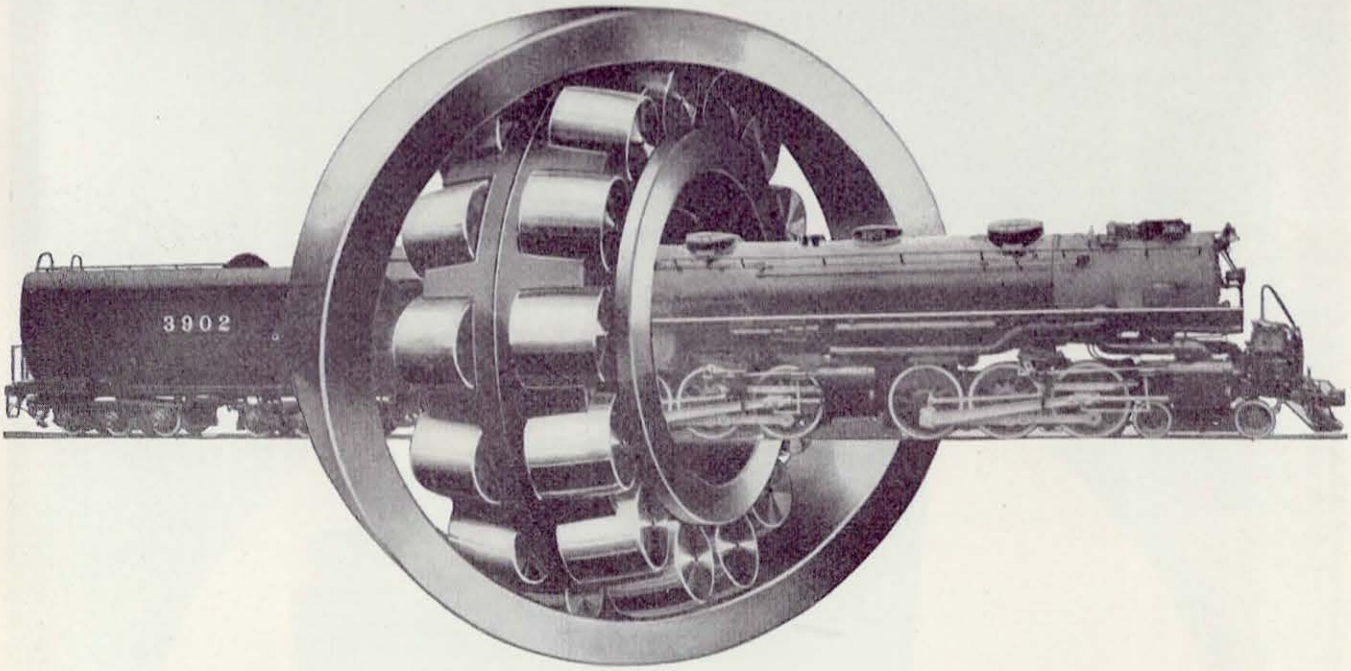
UNION PACIFIC APPLIES SKF BEARINGS TO 15 FREIGHT LOCOMOTIVES



UNION PACIFIC has learned by their experience with the four SKF-equipped high speed trains that the benefits of SKF Roller Bearings are not confined exclusively to the elimination of friction, but that AVAILABILITY . . . earning power . . . are also important factors.

To assure this same dependable revenue-producing performance for their 15 new freight locomotives, Union Pacific specified SKF which they know is synonymous with trouble-free bearing operation.

Investments like Union Pacific's can mean only one thing: SKF Bearings deliver the maximum in efficient service at the lowest cost per mile.

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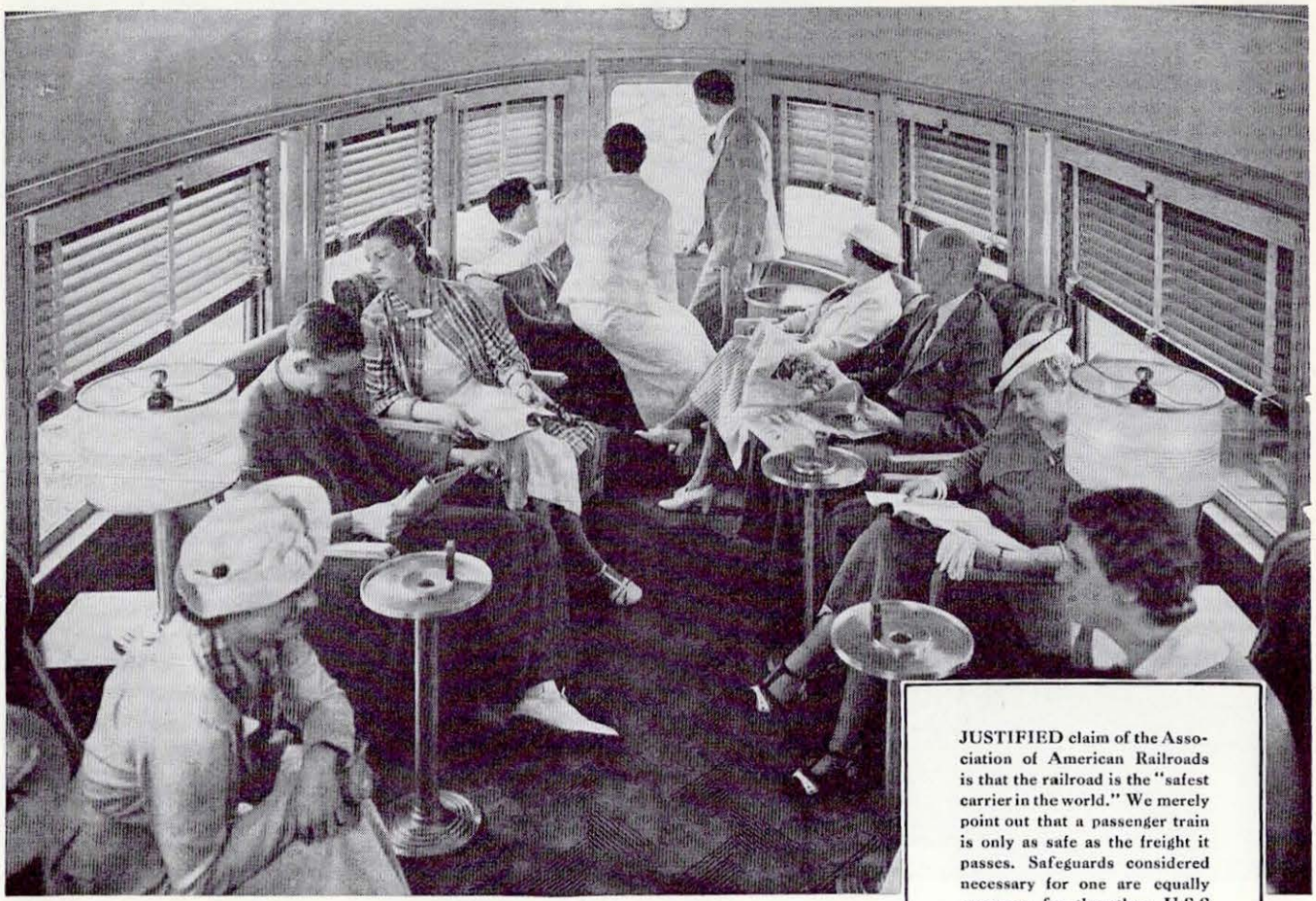
SKF ROLLER BEARINGS

Why does *"The safest carrier in the world"* roll on . . . WROUGHT STEEL WHEELS?



JUSTIFIED claim of the Association of American Railroads is that the railroad is the "safest carrier in the world." We merely point out that a passenger train is only as safe as the freight it passes. Safeguards considered necessary for one are equally necessary for the other. U S S Wrought Steel Wheels, accepted as standards of excellence in passenger service, are also indicated for every freight car on your line.

OBVIOUSLY because the wrought steel wheel offers increased insurance against breakdown —safe and dependable service under the heaviest loads and fastest speeds — lighter weight — lower cost per thousand miles of service.

But why equip only passenger cars with wrought steel wheels? Freight schedules approximate passenger speeds. Safe passenger service is vitally dependent on safer freight performance. Only one conclusion is possible. U S S Wrought Steel Wheels, long accepted as standards of wheel excellence, are indicated for every car on your line. Already these superior Wheels have demonstrated their safety under high speeds, their stamina under heavy loads.

U S S Wrought Steel Wheels in freight service will give unequaled dependability, increased resistance to shock and impact, uniform resistance to braking wear, definitely longer life. As you modernize your rolling stock, modernize your wheels.

U·S·S WROUGHT STEEL WHEELS

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh *Chicago*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Products Company, New York, *Export Distributors*

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NATIONAL TUBE COMPANY

PITTSBURGH, PA.

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Denver Zephyrs Ready for Overnight Chicago Service 658

A comprehensive description of these ten-unit partially articulated trains which seat 102 in coaches and provide 93 berths as well as complete lounge and dining facilities.

Electrical Men Meet in Joint Session 675

A report of these Chicago sessions at which all phases of things electrical were covered by the Electrical Section, A. A. R., and the Association of Railway Electrical Engineers.

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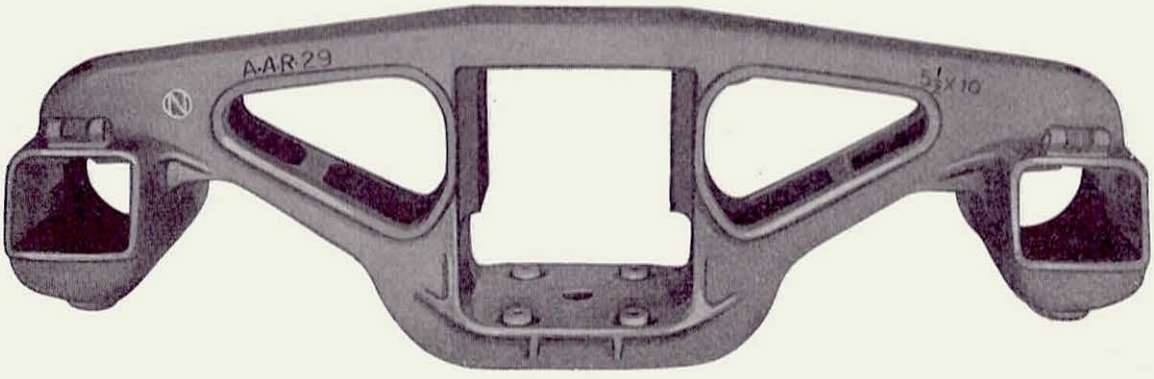
NATIONAL

A. A. R. SIDE FRAMES



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NATIONAL A.A.R. truck side frames are ideal for replacement on arch bar trucks and are furnished with features that produce economies in service.

They can be furnished with safety ledges cast integral that will prevent the brake beam from dropping on the track in the event of a brake beam hanger failure.

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By the elimination of many troublesome parts when replaced by the NATIONAL A.A.R. side frame, continuous and regular service from freight equipment is assured.

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The Week at a Glance

ANOTHER BRAIN TRUST?: Do the forwarders have a monopoly on the brains in knowing how to handle l. c. l. at a profit? Is the Railway Express Agency a "high cost carrier"? In the view of some people, apparently, both these questions would have to be answered in the affirmative. Whether or not such a conclusion is justifiable from the evidence is a question which is discussed editorially herein.

●

SEPTEMBER EARNINGS: Net railway operating income in September was 70 million dollars compared with 57 million last year. Gross for the month totaled 357 million; last year it was 307 million. Operating expenses were 249 million in September; last year the total was 218. For the nine months, gross was 2930 million, which was 17 per cent above last year, but was still 27 per cent under 1930. Net railway operating income for the nine months totaled 435 million, or 2.3 per cent on the investment. Last year only 1.7 per cent was earned.

●

TAXES SKYROCKETING: Railroad taxes for the first nine months of the current year have totaled 231 millions, as compared with 183 millions last year. In September of this year alone taxes were 27 millions—an increase of 29 per cent over last year.

●

C. AND D. IN THE EAST: The Interstate Commerce Commission has at last decided to permit the Eastern railways to provide free collection and delivery for less-than-carload freight. Last spring, it will be remembered, the Commission, in deference to the demands of the truckers, suspended tariffs affording this service in which all the Eastern roads joined. Shortly thereafter it approved, and then reneged, on tariffs of some of the roads which would have provided this free service, but without an allowance to customers electing to perform their own cartage.

●

ALLOWANCE TO SHIPPERS: The present decision authorizes the allowance (5 cents per 100 lb.) to both shippers and receivers who do their own carting, but it fixes the minimum rate at which free collection and delivery can be offered at 45 cents per hundred, whereas the railroads had proposed a minimum of 30 cents. Three commissioners dissented, among them Mr. Eastman, who does not think that the l. c. l. handling problem can be solved short of some kind of pooling. The roads have announced that the service will be inaugurated on November 16. Meantime, the truckers say they are going to take the case to the courts.

●

BEST JOBS: The leading editorial in this issue calls attention to the excellence of the jobs which the railroads afford in train and engine service on high-speed passenger runs—$250 or $300, or even more, a month for about 25 hours' work per week seems not to be unusual. The discussion points out that these occupations are definitely in the class of the professions and that, in employing new men, the railroads might well set professional standards.

●

TERMITES: These pestiferous insects are doing millions of dollars of damage to buildings throught the country; and no other industry knows so much about them and how to circumvent them as the railroads. The report of the Bridge and Building Convention in this issue includes a highly informative paper on these pests and what to do about them by H. R. Duncan, timber preservation expert for the Burlington.

●

CANADA: The Dominion, too, is going to have truck regulation. This was disclosed by the Minister of Transport in an address at Montreal this week. He said that the Railway Board would be converted into a Transportation Commission and would be given rate-making and regulatory jurisdiction over all forms of transportation which are amenable to control by the Dominion government. He also expressed a belief that the deficit of the Canadian National would be eliminated before his term of office expires.

●

CARLOADINGS: For the week ended October 24 loadings totaled 816 thousand cars, the fifth successive week when they have topped 800 thousand. But the year's peak has now, apparently, been passed since this week's total is down from that of the week preceding. The monthly chart of car loadings is published this week, showing the striking contrast of the 1936 curve with those of the two preceding years.

●

DENVER ZEPHYRS: Complete construction details of these new Burlington streamliners are given in two articles in this issue—one dealing with the 3000 hp. diesel-electric power units and the other with the revenue cars— 10 on each train. Each train has 102 coach seats, 93 berths, 10 parlor car seats, 104 lounge and dining car seats—with 31 additional seats in the dressing rooms. Many new refinements of design are included.

●

BETTER LIGHTS IN CARS: Railway electrical engineers, the report of their convention shows, are making rapid progress in developing lights for passenger cars that you can really see by. Valuable research by these engineers is disclosed also in several other fields—notably in air conditioning and in corrosion-resisting materials.

IMPOTENT BUSINESS: Fitzgerald Hall, president of the Nashville, Chattanooga & St. Louis, in a speech at Chicago on October 27 told a business group wherein and how sadly it had failed in giving intelligent leadership to the public —a speech which the election proved was prophetic. Mr. Hall's diagnosis of the trouble with business leadership and the remedial steps which must be taken if it is to regain public respect will prove a tonic for a patient who needs it badly.

●

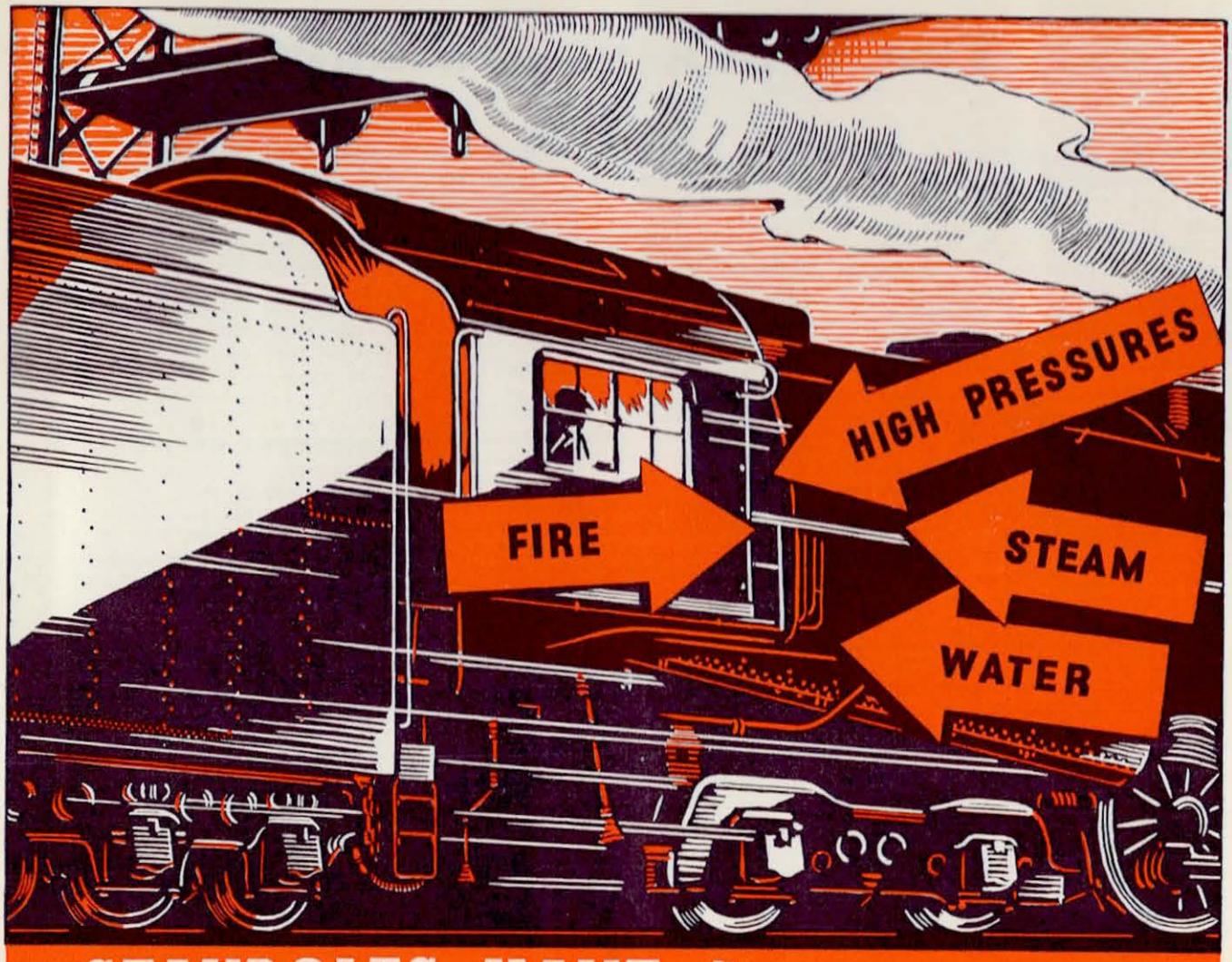
EQUIPMENT ORDERS: Orders for locomotives and freight cars are now more than double those placed in the entire year of 1935, the passenger car total having been over the 200 per cent mark since July. October orders included 22 locomotives, 1,310 freight cars and 5 passenger cars. The year's orders so far for each type of equipment total, respectively, 180; 38,664; and 146. And there are some big inquiries outstanding.

●

BOUQUETS: We have received many letters of congratulation on the editorial "Why Has Recovery Occurred?" in our October 24 issue. In this article we showed —we believe conclusively—that the recovery which has occurred since the bottom of the depression in 1932 is in no degree ascribable to governmental action. The outcome of the election does not change our opinion in the slightest; economic facts are not determinable by a show of hands. Particularly gratifying was a phone call we received from a nationally-known banker, in no way connected with the railroad industry, who asked us to enter a year's subscription for him so that he might follow our discussion of economic questions regularly. Our analysis of the recovery movement, he said, was the most thoroughgoing and convincing he had seen anywhere.

●

BRICKBATS: On this page each week we expect to present the outstanding happenings of the week in the railroad world, devoting only a sentence or two to each topic. In addition we shall aim to call attention to subjects of interest and importance which are dealt with in detail in the articles in the issue of *Railway Age* in which this page appears. We shall also include bits of casual information and comment which come our way, which we believe will be of interest to railroaders, even if they are not of lasting importance. The page will supplement, and in no sense take the place of, any of the material published in our regular editorial pages. The heading on this paragraph indicates our desire for your criticisms. We want to make this page a feature of value to our readers—to enable the busy railroader to get the gist of what goes on at the least possible expenditure of time on his part. So write and tell us how to do it better, won't you?



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Staybolts work in the dark, out of sight. No one knows exactly just what they must withstand. There are no tests known that exactly duplicate service conditions. » » » Service results alone can measure staybolt worth. » » » Agathon Staybolts are making records in modern locomotive service. » » » Agathon Staybolts have high tensile strength, unusual shock toughness and a high yield point that mean greater safety and fewer staybolt failures. In addition they are highly resistant to corrosion. » » » That is why Agathon Staybolts can be depended upon. Write Republic, Dep't R. A. for complete details.

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GENERAL OFFICES: CLEVELAND, OHIO

LOCOMOTIVE JACKET SHEETS

Among its many railroad specialties Republic makes steel sheets for locomotive jackets. They take a fine polish.

RAILWAY AGE

The Best Jobs Which Modern Industry Affords

A train or engine service employee has to serve a long apprenticeship in freight and local passenger service before the seniority rule will provide him with a run on one of the modern, high-speed passenger trains. During that period of training on a well managed railroad he acquires a sense of personal discipline and responsibility which are the very essence of railroad service. But once the employee acquires the seniority necessary to hold one of these high-speed runs his days of "fighting the extra board" and of service on slower trains are rewarded with a job of which it would be difficult to find an equal anywhere else in industry. Full time compensation on many of these jobs is earned with only 20 hours, or even less, of time on duty per week, while the earnings of the men holding them are high enough to compare with those of many professional men working many more hours per week. Their tenure is as secure as that offered anywhere in industry and on most roads the employee may look forward to a pension when he is no longer able to work.

These occupations have not always been so attractive. Traditionally, the railroad man has been thought of as one who sees little of his family, the bulk of his time being spent "on the road." But, with the change which has taken place as trains have been speeded up, the situation has been entirely altered. The engineman or trainman in modern high-speed service, while earning his full compensation, has more time left to devote to his family, or to civic affairs, or to the pursuit of some avocation than almost any other class of persons in our entire economic life. Certainly, as wage earners, such employees are in a class by themselves, and many professional men would envy them their jobs. The professions, it is true, hold out promise of greater compensation for the more ambitious—but only at the cost of heavy toil. No doctor or lawyer would ever achieve a great income by working only three or four hours a day.

The Growth of Leisure Hours

Of the justification for the favored position which the mature train or engine service employee has achieved there may be some difference of opinion. As has been heretofore shown in these columns, the increase in the speeds of many trains, unaccompanied by changes in the number of miles that must be run by crews to earn a day's pay, has operated substantially to increase the compensation per hour of engine and train service employees. The railways need to provide not only a faster but a more frequent service, especially a more frequent passenger service, in order to meet competition by highway and hold or recover traffic. Their ability to increase the total number of their employees is dependent upon their ability to increase their traffic and gross earnings; and excessively high wages per hour in any branch of service cause high cost of operation that hinders the increased frequency of service needed to meet competition. Whether justifiable or not, the high compensation being paid to the more favored employees in train service is a fact. To cite a few specific examples:

On the Milwaukee's "Hiawatha," between LaCrosse and Minneapolis, there are two engine crews who work about 2¾ hours daily (actual running time) which, with time on duty at terminals, totals to about 102½ hours per month. For this service the engineers receive monthly compensation of $285.69 and the firemen $219.89. Between Milwaukee and LaCrosse there are three engine crews (so that each works only 20 days out of 30). The actual running time of the trip is under three hours, and total time on duty averages about 96 hours per month. For this service the engineers receive as monthly compensation $263.82 and the firemen $203.06. There are four "Hiawatha" train crews between Milwaukee and Minneapolis. Each makes 15 one-way trips per month (which means that on 15 days they are off duty). On the days when they are on duty, the time worked is approximately 5¾ hours (actual running time), plus 30 or 45 minutes' duty at terminals. In other words, these crews work approximately 6½ hours a day for only 15 days of the month. For this service, the compensation of the conductors is $253.85 and of the trainmen, $178.12.

Jobs That Have Attained Professional Status

Engine crews on the streamliner "City of Denver" on the Chicago & North Western between Chicago and Clinton, Iowa, in a 30-day month are on duty approximately 107½ hours, for which engineers re-

ceive $333.75 and firemen $257.55. Conductors and brakemen on these runs have a total time on duty of approximately 80 hours a month for which they receive, respectively, $214.20 and $150.30.

On the Illinois Central's "Green Diamond" between Chicago and St. Louis, working an average of 113⅓ hours during the month, the conductors receive $278.94, the baggagemen $202.17 and the flagmen $195.72. Engineers between Chicago and Clinton, with hours on duty totaling approximately 90 per month, receive pay totaling $310.50, and firemen on the same run, with 84 hours on duty monthly, are paid $210.84. Between Clinton and St. Louis engineers are on duty 121⅔ hours per month and are paid $334.65, while firemen, working 107⅕ hours, are paid $215.66.

On the New York Central, between New York and Buffalo, there are some 60 train crews who make the through run of 436 miles in as little as 8½ hours—and quite generally in less than 10 hours. These crews are limited to 12 one-way trips a month, which means that they have 18 days out of every month off duty, meantime earning full compensation.

These instances of train and engine service hours and compensation are taken quite at random. Almost every railroad which offers modern, high-speed service, would yield similar examples of favorable working conditions for these employees. However, these instances do not represent the average conditions obtaining on the railroads—but rather the best which each road has to offer to its most mature and experienced employees in train and engine service. Such jobs, however, may be aspired to by every employee entering the service, provided he begins as a relatively young man. And the jobs in freight service and in slower passenger service are perhaps even better in proportion to what they were 15 or 20 years ago, than are those on the "crack" trains.

Selecting Entrants—a Great Responsibility

Railroad employment, particularly in the train and engine services, thus has undergone a complete transformation during less than a generation. From a hazardous occupation of long and uncertain hours, it has become, at its best, one of greatly improved safety, of easy hours and of a dignity worthy of the learned professions. The time is not far distant when the railroads, here and there, will have once more to begin taking on student brakemen and firemen to be the passenger engineers and conductors of another day. Considering the attractive future of railroad work as demonstrated by the hours and earnings of the present "old timers," there is no reason why the railroads should not have their pick of the young men in their communities when opportunity comes to employ student train and enginemen.

The record of safety and superior service of the railroads, and the status of mature railroad employees in the community, offers ample testimony of the quality of character which long experience in railroad work develops, even when the selection of entrants is rather haphazard, as it was in the past. As President D. B. Robertson of the Brotherhood of Locomotive Firemen and Enginemen aptly said in an address at Dallas on October 4: "This is the kind of service which breeds a respect for, and a real understanding of discipline and organized effort. At the same time this service gives to each man a sense of independent power and responsibility which preserves both his self-respect and his deep interest in the work in which he is engaged. For these reasons, among others, I think there will be general agreement that railroad men . . . . represent a substantial body of the most reliable type of citizenship that will be found anywhere."

Today, because railroad work—particularly train and engine service—has, relatively, become so much more desirable than ever before, the railroads have an unparalleled opportunity by careful selection of beginners to assure that the next generation of railroaders shall stand entirely alone among industrial employees in intelligence, in character, in efficiency and in leadership in their communities. The railroads are paying for the best in personnel. Forward looking managements will see to it that, in hiring new men, they get what they are paying for.

The Election

The most outstanding fact about the national election is that President Roosevelt won probably the greatest personal victory ever won by any man in a political contest in the history of the world. He has had more power during his present administration than any preceding president and apparently the result of the election gives him increased power. Most persons anticipated that, even if he were re-elected the Democratic majorities in Congress would be reduced, and that he would be faced with more opposition during his second term. His victory is so great, and is so plainly and largely a victory for him, that it seems not improbable Congress will be as submissive to his will during the next two years as it has been during his first term.

What does this mean for business? Nobody can now answer that question. The *Railway Age* adheres to the view expressed by it last week that most of the recovery thus far has been due to the same natural economic causes that terminated previous depressions and that the improvement in business has now acquired such momentum that it will continue at least throughout the next year.

President Roosevelt, by what he said in most of his important speeches, recognized that the improvement that has occurred in business was his trump card. He attributed the recovery that has occurred to his policies. There are differences of opinion about that, but about whether the improvement in business during the last fifteen months contributed largely toward the result of the election there can be no question.

He will, of course, desire the improvement of business to continue during his second term. But he will also undoubtedly desire to carry out policies that he believes will use the power of government to re-distribute wealth and income to the advantage of the so-called "under-privileged classes." If these policies hinder increase of production they will hinder increase of the wealth and income to be distributed.

A large majority of business men and economists opposed Mr. Roosevelt's re-election upon the ground that certain of his past policies, especially N.R.A. and huge government spending, had been inimical to recovery, and that the pursuit of similar policies in future would hinder continuance of recovery and finally lead to ruinous inflation. His overwhelming political victory has not altered their views. Most of those who voted for him do not understand the difficult problems of economics involved in the election and those who do not understand these problems can be wrong, no matter how many millions of them there are.

What, then, will be the President's future policies affecting business? That is the most important question confronting the country. His policies during his present administration suggest an answer that is not reassuring. But the President must know more about the real causes of the recovery that thus far has occurred than was indicated by his speeches, and he may be largely influenced during his second administration by desire not to interfere with operation of these real causes of recovery.

The outcome of the election presents two questions to the railways. One is, what will be its effects upon general business, and consequently on their traffic? The production and distribution of commodities and, therefore, railway freight traffic undoubtedly will continue to increase during the next year. And future government policies affecting business will not be determined entirely by Mr. Roosevelt and Congress. Even though there occur changes in the personnel of the Supreme Court it will continue to be composed of lawyers who will as heretofore, no doubt, continue to pass upon acts of Congress in accordance with their own views as to their constitutionality. And it will continue to be difficult to accomplish an economic revolution without a constitutional revolution.

The second question the election raises for the railways is as regards government policies particularly affecting them. They had no reason for satisfaction with the policies applied to them by government under the Old Deal. The Roosevelt administration has been the first to favor and actually secure legislation to make more equitable government policies affecting competition between them and other carriers. It has been understood since before and throughout his present administration that the President is opposed to government ownership. The railroad labor unions undoubtedly will press their proposed legislation to establish a 6-hour day at 8 hours' pay. The President can hardly fail to see that such legislation would strongly tend to bankrupt private ownership and make government ownership unavoidable.

Most business men did not originally oppose N.R.A., but most of them finally opposed the major policies of the New Deal. Most of them opposed Mr. Roosevelt's re-election. They have been soundly beaten. There is only one thing they can now reasonably do—accept the result philosophically, continue to oppose government policies that they consider unsound and advocate government policies they consider sound, increase their efforts to enlarge sales, and improve operating and financial results in their own businesses, and co-operate in improving business as a whole. Meantime, they may well ponder the question why the views of business men regarding government policies affecting business had so little influence on most voters.

If continued improvement in business does not occur there will be a reaction of public sentiment against the President and his policies before the next Congressional election among the same voters who supported him because business has improved. If business continues to improve, whether because of or in spite of his policies—well, that will be just what business men want. The only thing for business to do is to try courageously to continue the forward march that it has been making for over a year. The restoration of prosperity is principally dependent upon the efforts of the country's millions of business men; and the best antidote for radicalism is prosperity.

Just How Efficient Are the Forwarders?

John R. Turney, author of the Federal Co-ordinator's much discussed report on merchandise traffic, is now in private practice as an attorney for a leading freight forwarder—Acme Fast Freight, Inc. His report, it will be remembered, recommended turning over all l.c.l. operations to two nation-wide consolidating organizations, to be owned by the railroads. Following the publication of this report, there was a great deal of discussion of this and alternative proposals for handling l.c.l.—among them one that the Railway Express Agency, being railroad-owned, nation-wide in operation and with long experience in similar work, would be the ideal organization to take over this service for all the railroads.

But a "whisper" not unlike those of a political campaign went around to the effect that the Express Agency was a "high cost carrier" and less efficient than forwarding companies. Mr. Turney, in his cross examination of an Express Agency witness at the I.C.C. forwarder inquiry in New York recently developed the point lying behind this criticism. In substance it is that the Express Agency first pays its own operating expenses and then divides what is left among

the railroads which handle its traffic. With the present diminished state of express business, the revenue received by a railroad for handling a car of express is frequently less than it would receive for handling a carload of forwarder business. Hence, it is alleged, it is to the advantage of the railroads to side-track the Express Agency and favor the forwarders.

But does this clinch the case against the Express Agency as a "high cost carrier"? Obviously it does nothing of the kind. The forwarders take the cream of the business between large centers of population and leave the Express Agency and railroad l.c.l. service with the skimmed-milk job of serving the small towns and handling the unremunerative traffic. Naturally, this distorts both the cost and revenue figures against the Express Agency and railroad l.c.l. service, and makes them appear costly and unremunerative as compared with forwarder traffic. On the other hand, who knows what the comparative figures would show if the forwarders should hold themselves out to give complete service, taking the fat with the lean? And, if they are to solve the railroads' l.c.l. problem, that is what they must do.

The *Railway Age* has no partisan interest in behalf of the Railway Express Agency or against the forwarders. But it is interested in seeing l.c.l. handling reformed in such a manner as to solve the problem of truck competition, with a reduction of costs and improvement of service which will bring the highest net revenue to the railways. If the forwarders have such a monopoly of the brains in this business that they can handle this traffic, take their profit and still leave the railroads more net money than they would have if they handled the traffic themselves or through the Express Agency—then more power to the forwarders. But their possession of this monopoly of brains has not yet been proved; and it cannot be proved by comparing cost and revenue figures of the forwarders' strictly selective operations on the one hand with those of the all-coverage Express and railroad l.c.l. operations on the other. The comparison has forensic advantages, to be sure, but its scientific value is precisely nil.

1936 Equipment Orders Double 1935's Totals

During the first ten months of 1936 domestic orders have been reported in *Railway Age* for more than twice as many locomotives, freight cars and passenger-train cars as were ordered throughout 1935. October orders brought this year's business in the locomotive and freight car fields to that level, while, as pointed out previously, the 1936 passenger-train car orders have been double those of 1935's twelve months since the end of July. Also, rail orders reported up to the end of October have involved an aggregate tonnage which is one-third greater than that placed last year.

Last month orders for 22 locomotives were reported, bringing this year's ten-months total to 180 as compared with last year's twelve-months figure of 83—both exclusive of power units for streamlined trains. In the entire twelve months of only one year since 1930—1934 with its orders for 183—have locomotive purchases exceeded those of 1936's first ten months. Included in this year's business have been orders for 143 steam locomotives—more than five times the 28 of this type ordered throughout 1935 and but one short of twice the 72 ordered in 1934. As pointed out in the *Railway Age* of October 10, the number of steam locomotives ordered in 1936 was by the end of September equal to the number of that type ordered during the four previous years, 1932 to 1935. On November 1 inquiries were outstanding for 142 locomotives for domestic service and 13 for export and plans had been announced for the acquisition of 5 others for domestic service.

With the October orders for 1,310 freight cars the 1936 total reached 38,664. This, as pointed out at the outset, is more than twice the 18,699 freight cars ordered throughout 1935, and is a better volume than that reported for the entire twelve months of any year since 1930 when orders for 46,360 freight cars were reported. Furthermore, this year's freight car business in the export market is generally in the same relative position, the 1936 orders for 516 cars being a better export volume than that of any year since 1930, save 1934. In addition there were outstanding at the close of last month inquiries for 1,200 freight cars for domestic service, and 1,100 for export while plans had been announced for the purchase of more than 3,300 others for domestic service.

October's orders for five passenger-train cars constituted the first business reported in this field since July. The 1936 total is now 146 cars, exclusive of articulated units for streamlined trains. These 1936 passenger-train car orders, as pointed out above, have, since the end of July, been more than double 1935's 12-months total of 63. Also, this year's ten-months business exceeds that of any full year since 1930, except 1934 when 388 passenger-train cars were ordered. Domestic inquiries for 18 passenger-train cars were outstanding on November 1 while, in addition, one road had announced plans for the acquisition of six streamlined trains.

Rail orders placed last month aggregated 110,237 tons—the largest volume of any month this year except January and February. The 1936 ten-months total of 662,822 tons compares with the 495,300 tons placed throughout 1935.

The Week at a Glance

A New Feature

See page 43 in the Advertising Section

Why Business Opinion Is Impotent*

Power and prestige have been lost to politicians because business men have not dealt decently and frankly with each other and with employees — How leadership can be regained

By Fitzgerald Hall,
President, N. C. & St. L.

BUSINESS—and when I use that term I am not talking merely of manufacturers but of all kinds of productive endeavor—has certain responsibilities, over and beyond the mere payment of taxes, both toward its local and state institutions and the national government.

This so-called federal government is not a complete system of government and was never so intended. It has no inherent powers; it has only those powers which the people, acting through each sovereign state, specifically vested in it. Therefore, what a state may legally and properly do in relation to its own internal affairs—social and economic—is neither a measure nor a guide to what the federal government may do under the Constitution of the United States.

"No Man's Land" Not an Oversight

Each state has its own organic law, made by its own people, subject to change at their will. The people of the several states vested the constituted authorities of their respective states with certain powers, and generally they retained unto themselves alone certain powers, rights and responsibilities.

The result of all this is that the American people have deliberately refused, in creating their several state governments and their common agency, the federal government, to vest in public authority, local, state or national, complete powers. I say they did this *deliberately* because the history of governments in the past, which the founding fathers so well knew, demonstrates that the people cannot afford under any form of government to vest in public authority complete jurisdiction of all of their affairs.

So all of this alleged surprise in certain circles about there being a "No-man's land" into which government, state or national, may not intrude itself has been and is well known to every reasonably well-informed individual. I repeat that this so-called "No-man's land" was not an accident, it was not an oversight, it was not a mistake, but was the deliberate and informed judgment of our people, who preferred that certain of their activities should not become subject to political action.

The fundamental theory of our government is based on (1) belief that the average man is competent to run his own affairs better than any office-holder and that the less government we have, the happier and more prosperous we will be, and (2) that social, religious and economic problems can be better solved by each community in accordance with local conditions than by attempting a national standard applicable to all. The American system is based both on common sense and experience and its object is to give each individual the greatest possible opportunity to take advantage of his own talents.

Power-Hungry Politicians

Now, with our system of government as it is, what is the general situation in which we find ourselves?

First, there has been for years a constant tendency, of which all political parties are equally guilty, on the part of the politicians and the self-styled reformers to undertake to depart from the limitations imposed upon them by our several organic laws, to ignore the difference between the rights of the several states and the federal government, and to invade that "No-man's Land" which we as a people so carefully and so wisely created as our protection against the office-holding class—because the office-holding class, regardless of title, in all nations and at all times have been the greatest menace to happiness, liberty and prosperity of people as a whole.

Second—too often we find men in high authority, exercising important governmental powers, whose previous training and experience does not qualify them to intelligently and wisely perform their public trusts.

So it is that the office-holding class is constantly attempting to encroach upon the private rights of the citizen, constantly undertaking not simply to regulate in the public interest but to invade the field of management and of ownership itself. The recently enacted law imposing special and confiscatory taxes on profits earned which are not promptly paid out in dividends is not only the baldest economic fallacy, but is a direct, and in my opinion unconstitutional, inva-

The Narrow Selfishness of Business

Business men, looking for some immediate selfish financial advantage, have themselves unhesitatingly advocated governmental policies as to others which they denounce when made applicable to themselves. They ignore our system of government—they ignore the rights of others. Perhaps the attitude of business generally toward public transportation in its entirety is the best illustration of what I mean.

They have sought temporary, selfish advantage in fostering unsound transportation development—they have advocated regulatory policies not only unsound per se, but regardless of the line of demarcation between state and federal rights. They have sought high tariffs, apparently without thinking of the effect on others.

The fundamental concept of our political philosophy—"Equal rights to all and special privileges to none"—has been as openly and flagrantly violated by business men as by politicians.

* From an address before the Illinois Manufacturers Costs Association, Chicago, October 27.

sion of the rights of ownership of property. But the average politician has no real regard for the people's rights—what they want is votes.

Assuming this tendency to be unwise, as I think it is, whose fault is it and what is the remedy? Wherein should business be interested? For this condition business men—still using the broad definition of that term—are equally responsible with any other group. In relation to government, has business met all of its responsibilities? Reluctantly, I express this opinion, speaking generally, that it has not measured up to its responsibilities. I do not mean to suggest that it has failed more than any other group or class, because that is not true.

Under these conditions, then, what is there for business men, individually and jointly, to do which would better enable them to justify their existence and to help perpetuate our great representative democracy. For whatever it may be worth, I give you some of my views.

Wherein Business Fails

First, some criticisms, then some suggested remedies:

1. Thinking primarily of their own immediate financial situation, business men try to curry favor with both sides in a political campaign. In my opinion, a man who deliberately contributes to both contesting sides in an election is not only not a good citizen, but not even a decent citizen. Such a one is simply trying to buy favor—he is undermining our system of government.

2. Business men, looking for some immediate selfish financial advantage, have themselves unhesitatingly advocated governmental policies as to others which they denounce when made applicable to themselves. They ignore our system of government—they ignore the rights of others. Perhaps the attitude of business generally toward public transportation in its entirety is the best illustration of what I mean. They have sought temporary, selfish advantage in fostering unsound transportation development—they have advocated regulatory policies not only unsound per se, but regardless of the line of demarcation between state and federal rights. They have sought high tariffs, apparently without thinking of the effect on others. The fundamental concept of our political philosophy, "Equal rights to all and special privileges to none," has been as openly and flagrantly violated by business men as by politicians.

We have thought too much of our individual problems—not enough of our common problems. If this depression has taught us anything, it is that we must prosper as a whole, or suffer as a whole. The relationship of all lines of endeavor—their mutual dependency, their respective rights, have not been given sufficient consideration. The basis of all business statesmanship is an accurate knowledge of facts—the relation and probable effect of any given action to and on others.

3. Business men have, for supposed immediate selfish financial advantage, hesitated to express their views on important controversial questions. They do not want to offend any of their potential patrons, so they keep silent, leaving, in large degree, the crystallization of public opinion on the great questions of the day to the office-holding class, with inevitable result that the people as a whole do not really run this country as they should do in a representative democracy—and as they must do if the American system is to be perpetuated.

Foolhardy Lobbying

4. Dealing with legislative and similar matters, some business men, in what we ordinarily term "lobbying," have been guilty of absurdities, to put it mildly, which are neither explainable nor justifiable. The recent conduct of a few of those in the utilities industry has been a public disgrace, with the result that a few foolish or bad men have brought many good men in the same line of endeavor—indeed, business men in general—into public disrepute. But I have yet to see business in its organized capacity denounce by name those who have been traitors to legitimate business, and clean their own house as they, in my opinion, should do.

Business has a right to be heard on all legislation affecting it, but its influence should be exerted openly and honorably, for in no other way can it permanently protect itself.

Business Must Openly Denounce Traitors

Dealing with legislative and similar matters, some business men, in what we ordinarily term 'lobbying', have been guilty of absurdities, to put it mildly, which are neither explainable nor justifiable. The recent conduct of a few of those in the utilities industry has been a public disgrace, with the result that a few foolish or bad men have brought many good men in the same line of endeavor—indeed, business men in general—into public disrepute.

But I have yet to see business in its organized capacity denounce by name those who have been traitors to legitimate business, and clean their own house as they, in my opinion, should do.

5. Another fault of business, in my opinion, is that there is too great a tendency for big corporations to buy up small prosperous independent corporations, that is, to create monopolies. It may well be that such action will permit, through mass production, a cheapening of costs to the public; but, on the other side, it destroys what, in my opinion, is an indispensable factor in our economic system, namely, many independently owned and operated businesses engaged in active competition. Public reaction, speaking generally, to such mergers and consolidations will eventually bring about legislative reprisals, which are bad for all.

Business cannot justly complain when the officeholder seeks more power in the governmental field, if it constantly does the same thing in the economic field. Exactly where the line should be drawn I confess I do not know—here certainly is a field for business statesmanship. But the fact remains, and the sooner we realize it the better, that the public distrusts very large organizations—and the public will, in the end, control—and should.

6. We, as a whole, have not taken our own employees into our confidence. They learn what little they know about our affairs from their own leaders or the politicians. Some employees have been overworked and underpaid—when a few do this, we all suffer. It is one of our greatest problems, and is, and should be, receiving our personal attention. Denouncing labor leaders and politicians will not solve this problem. We must prove by our own voluntary acts that our men may safely rely on us for a square deal.

So much for criticism; now what can and should we do about it all? A few suggestions, if I may.

1. We, the business men of this country, should each

study and become definitely and accurately acquainted with our political system, local, state and national, and we should advocate no action inconsistent therewith. Do not misunderstand me. I do not oppose real progress. Improvements may undoubtedly from time to time be made but they should be made only in that orderly manner provided by law. Making a change in the proper way is just as much a part of our system of government as the exercise of functions already vested in public authority. But we should insist, first at the bar of public opinion, then, if necessary, in the courts, that legislative and administrative action conform to the American system.

Citizenship Too Easy to Attain

2. We should insist, as I think we properly can, that those who come to America to seek liberty and to make their fortunes should accept our system of government without undertaking to alter it after the manner of their native and foreign systems, which they have deserted.

It has been too easy under the law for foreigners to get into this country and too easy for them to become citizens. Further, it is unsound public policy to permit foreigners, having come in, to change their real names. They should do business and seek governmental reforms, if they can be called reforms, under their own real names—not assumed ones.

3. We should see to it that in our educational and business institutions, and elsewhere, all the people are taught just what our system of government is, its powers and its limitations, wherein it differs from forms and systems in other countries, now and heretofore—and above all its unquestioned blessings to the average citizen. We should demonstrate, as we can, by intelligent analysis that the American system of government is the best on earth—and that its attempted destruction by foreign thinking persons is contrary to the public interest and not to be tolerated.

The belief that "It cannot happen here" is unhappily not true and American business should rise en masse to support the American system which has brought to the average man the greatest political and economic freedom and the greatest average prosperity known in recorded history.

4. We should take an active part in all politics, not merely that we may hold office, not that we may control the men and women who do, but because that is the only way in which we can perform the responsibilities of a citizen living in a representative democracy. Mere voting is not enough. The political organizations of this country, local and national, are very largely in the hands of the office-holding class. You and I have practically no voice in the making of party platforms, in determining public policies, or choosing candidates for any public office. When we merely go to the polls to vote for one of the hand picked candidates which the highly organized office holders have nominated, we fail miserably in the performance of our public responsibilities. I do not doubt that each of you have been in the same situation in which I have frequently found myself, namely, that in voting I simply undertake to find that individual who seems to me to be the least objectionable, and not infrequently I find none who are not objectionable.

Dealing Honestly With Employees

5. One of the sore spots in this country is the relationship between employer and employee. This is a problem which the politicians can never settle, because the politicians almost invariably are merely seeking votes—not an intelligent, fair, workable, longtime program between employer and employee. The necessity for labor unions was largely brought about by the selfishness and ineptitude of some business men. The result is we all suffer. Here is the most fertile field for the foreign agitator and the contemptible demagogue. The present situation demonstrates that.

The effort is being made even by some in high places to make class distinctions and to undertake to array one class against another, when in point of fact, they have a common interest and should be working directly with each other. How many business men undertake to discuss all of their problems, without reservation, directly and frankly with their own men? We frequently criticize the politicians, and justly so, for the manner in which they deal with public questions. And yet, has the average man in business dealt any more frankly with his own employees? I repeat that no political action will ever settle the so-called labor problem. That problem has its genesis in human nature and, try as the politicians will, human nature cannot be altered by legislative or administrative edict. What we need is direct, fair and intelligent co-operation between those in managerial positions and their fellow-workers whom they direct. But we must so conduct ourselves as to merit the confidence and trust of our men. If we play the game fairly, so will they.

6. What we need in public office is not men who have made failures in private life but those who have made a success; and if successful men are not patriotic enough to perform their part of this common responsibility of government, then they have no just cause to complain.

If we are to have good government, if we are to maintain our great representative democracy, if our children are to have the blessings of liberty and freedom of opportunity, then all of us, all the time, must be willing to fulfill our several responsibilities at whatsoever cost.

Mergers Have Gone Too Far

There is too great a tendency for big corporations to buy up small prosperous independent coporations, that is, to create monopolies. It may well be that such action will permit, through mass production, a cheapening of costs to the public; but, on the other side, it destroys what, in my opinion, is an indispensable factor in our economic system, namely, many independently owned and operated businesses engaged in active competition.

Public reaction, speaking generally, to such mergers and consolidations will eventually bring about legislative reprisals, which are bad for all. Business cannot justly complain when the office-holder seeks more power in the governmental field, if it constantly does the same thing in the economic field.

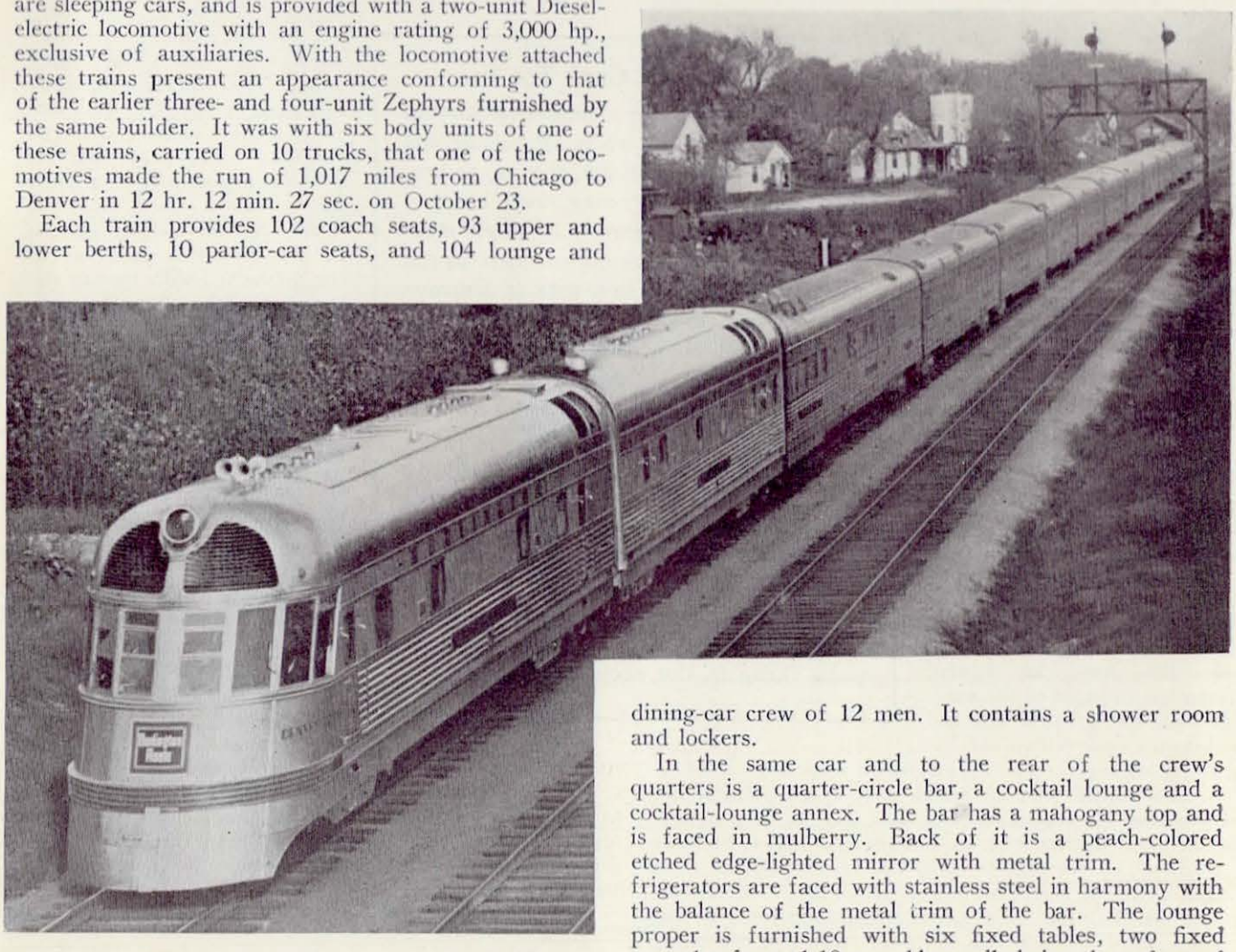
AIR EXPRESS SHIPMENTS set a new all-time high monthly record in September, according to a recent statement from the Air Express Division of the Railway Express Agency. During that month 43,153 packages were handled in the air express service, an increase of 14 per cent over August. For the first eight months of 1936 the air express business showed an increase of 66 per cent over the corresponding period of 1935.

Denver Zephyrs Ready for Overnight Chicago Service

Ten-unit partially articulated trains seat 102 in coaches and provide 93 berths with complete lounge and dining facilities

TWO light-weight stainless-steel air-conditioned trains for overnight service between Chicago and Denver, Colo., were delivered during October to the Chicago, Burlington & Quincy by the Edward G. Budd Manufacturing Co., Philadelphia, Pa. These trains, known as the Denver Zephyrs, Nos. 9906 and 9907, will be placed in regular service on November 7 on a 16-hour overnight schedule between the two cities. Each train is made up of 10 revenue body units, of which four are sleeping cars, and is provided with a two-unit Diesel-electric locomotive with an engine rating of 3,000 hp., exclusive of auxiliaries. With the locomotive attached these trains present an appearance conforming to that of the earlier three- and four-unit Zephyrs furnished by the same builder. It was with six body units of one of these trains, carried on 10 trucks, that one of the locomotives made the run of 1,017 miles from Chicago to Denver in 12 hr. 12 min. 27 sec. on October 23.

Each train provides 102 coach seats, 93 upper and lower berths, 10 parlor-car seats, and 104 lounge and dining seats, with 31 additional seats in the men's and women's dressing rooms. Crew quarters are provided ahead of the cocktail lounge, with bunks for 12 persons.



Back of the locomotive each train consists of six independent vehicles, some of single-body units and others two and three-unit articulated vehicles. The first unit is a two-truck car comprising an auxiliary power unit which will supply 220-volt, 60-cycle, three-phase current for operation of lights, bar refrigeration and air-conditioning equipment. The equipment consists of four Diesel-driven generators, each with its own control panel. Back of the power unit is a 30-ft. railway post office and then a 24-ft. baggage space.

The second body unit is a two-truck car consisting of a 23-ft. baggage space and sleeping quarters for the dining-car crew of 12 men. It contains a shower room and lockers.

In the same car and to the rear of the crew's quarters is a quarter-circle bar, a cocktail lounge and a cocktail-lounge annex. The bar has a mahogany top and is faced in mulberry. Back of it is a peach-colored etched edge-lighted mirror with metal trim. The refrigerators are faced with stainless steel in harmony with the balance of the metal trim of the bar. The lounge proper is furnished with six fixed tables, two fixed curved sofas and 10 movable small chairs, the sofas and chairs being upholstered in dark tan leather. The cocktail annex, which is separated from the lounge by an ornamental aluminum grille, contains accommodations for 16 passengers at tables between transverse leather-upholstered seats. A hinged cushion on the aisle seats provides easy access to the window seats.

The lighting in this entire compartment is furnished

by indirect lights mounted in a pair of overhead ducts and by direct lighting furnished by vertical column lights placed on the pier panels. The lighting over the bar is furnished by lights hidden in a cove and by the edge-lighted mirror. The interior walls are painted mulberry below the belt rail to match the face of the bar and are covered with quartered oak paneling between the belt rail and the upper window rail, above which the walls and ceilings are painted buff. Venetian blinds at the windows are green on the inside and silver on the outside to match the stainless-steel train. The floor is covered with a light brown linoleum.

The third body unit is a semi-articulated coach, seating 64 persons, with a vestibule at the forward end. The seats are the rotating type with three-position reclining backs, and removable center arm rests. They are

Dimensions and Data for the Denver Zephyr Trains

Length overall (including locomotives), ft. and in.	883— 9
Width inside, ft. and in.	9— 3¼
Width over bottom skid rails, ft. and in.	10— ⅛
Height, rail to top of locomotive roof, ft. and in.	13—10½
Height, rail to top of car roof, ft. and in.	12—10¼
Height, rail to top of passenger floor, ft. and in.	4— 9/16
Estimated weight of 10 body units ready to run, lb.	831,000

Passenger accommodations:

Coach	102	Observation lounge	22
Section sleepers	72	Diner	40
Bedrooms	12	Cocktail lounge	18
Compartments	6	Cocktail annex	16
Drawing room	3	Card playing section	8
Parlor	10	Grand total	309

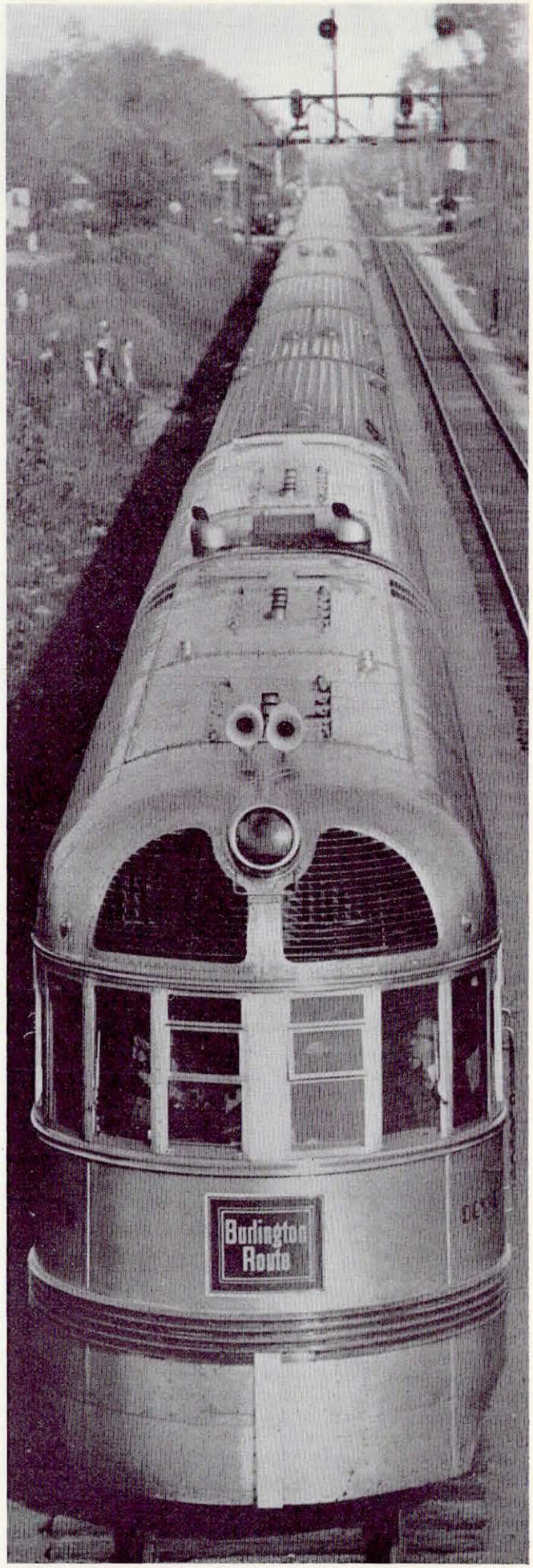
upholstered in a cheerful bluish-green striped plush and are provided with ash receivers which are built into the back accessible to the persons behind. Provision is made for setting tables between pairs of seats. Draperies are light olive green, roller curtains are sea green and the carpet is taupe. At the forward end of the car, just back of the vestibule, are placed ladies' and men's rooms and

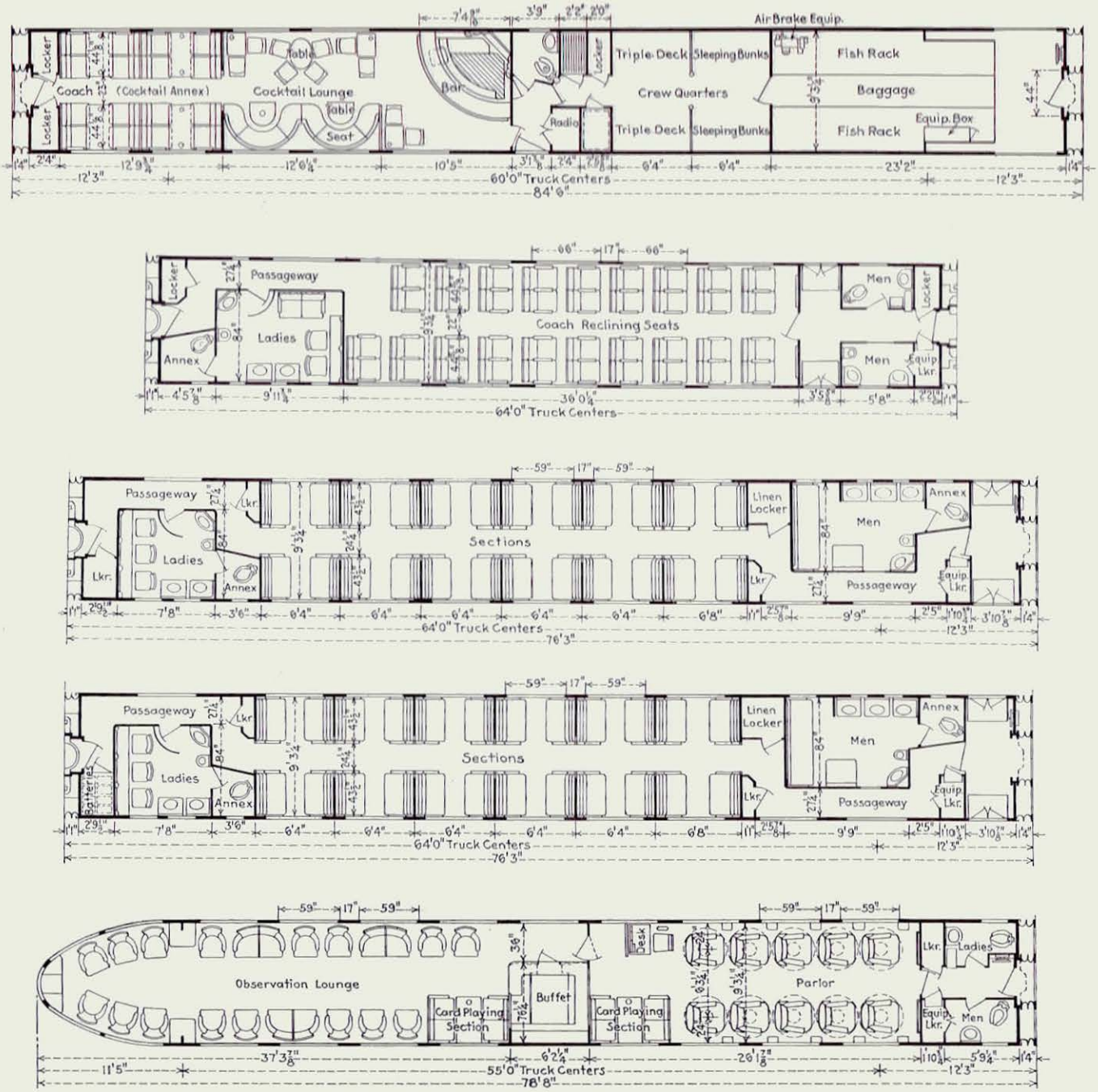
Names of the Denver Zephyr Units

	No. 9906	No. 9907	
Locomotive Unit A.	Silver King	Silver Knight	1,800-hp. locomotive.
Locomotive Unit B.	Silver Queen	Silver Princess	1,200-hp. booster.
1	Silver Herald	Silver Courier	Aux. engines, mail and baggage compartments.
2	Silver Bar	Silver Lining	Coach, cocktail room, crew quarters, crew shower bath, toilet, baggage compartment.
3	Silver Spruce	Silver City	64-seat coach.
4	Silver Plume	Silver Lake	38-seat coach.
5	Silver Service	Silver Grill	40-seat diner.
6	Silver State	Silver Skates	12-section sleeper.
7	Silver Tip	Silver Screen	12-section sleeper.
8	Silver Tone	Silver Arrow	12-section sleeper.
9	Silver Threads	Silver Sides	Sleeper with six bedrooms, one drawing room, three compartments.
10	Silver Streak	Silver Flash	Comb. parlor car and observation lounge.

at the rear of the car are two luggage lockers. Lower walls at the ends of the car and the pier panels are gray-green, while the upper walls and ceiling are cream.

The fourth body unit is a fully articulated coach, seating 38 passengers, fitted with three-position reclining seats. The seats are upholstered in henna with a two-tone striped pattern, the draperies are golden tan, the lower walls rust, the upper walls and ceiling flesh color, and the floor carpeted in mahogany. Between the forward end of the car and the entrance doors are two men's rooms, one a lavatory room and the other a toilet room. In the rear of the car is a spacious and luxuriously furnished ladies' lounge and annex. The lounge contains leather-upholstered chairs and sofa, dressing



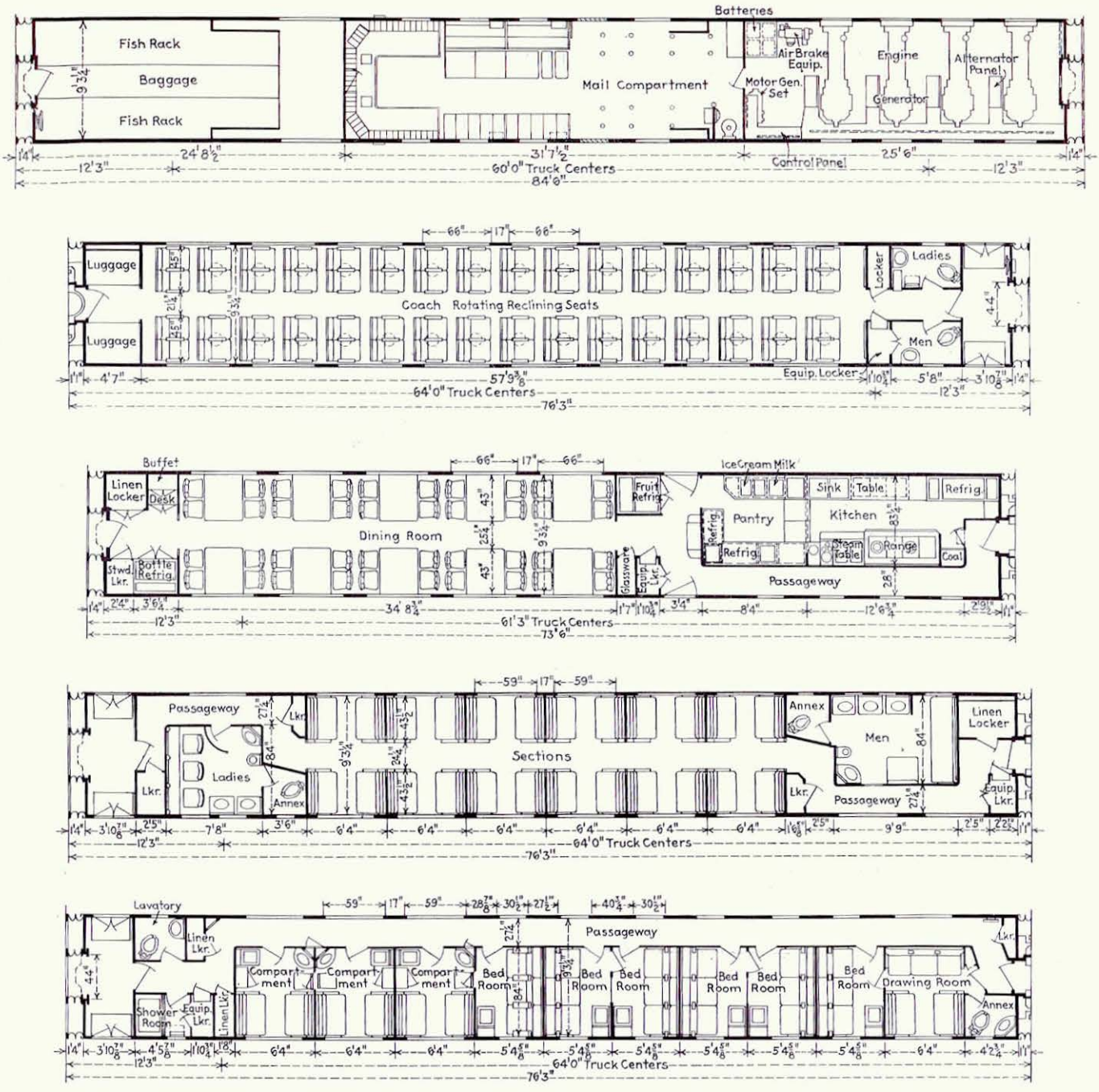


Arrangement of Facilities

table, electrically lighted mirrors, wall clock, dental fountain and three blue porcelain wash stands.

The fifth body unit is a semi-articulated 40-passenger diner, with a kitchen 23 ft. long. Just back of the kitchen are fruit refrigerators on the one side and a pair of lockers on the other, one for storage of bread, glassware, etc., and the other to house equipment. At the rear of the car is the steward's compartment, in which are linen locker, steward's locker, a bottle refrigerator, a buffet and a steward's desk. The desk is furnished with a telephone by which he can communicate with the bar at the forward end and the buffet in the rear car. The chairs have comfortable leather upholstery and the tables have ample room for four persons.

The sixth and seventh body units constitute an articulated pair of section sleepers, each of which has 12 sections with a men's room at the forward end and a ladies' room at the rear end. The seats in one of the cars are upholstered in a dark brown with a light tan figure design. The lower and end walls are in greenish gray-blue and the section partitions and ceiling are drab. Section curtains are brown, as is the carpet. The roller curtains are chocolate. In the other car the walls and ends are in dark brown and the ceiling and section partitions in a bluish tint. The seats are upholstered in blue with tan stripes and the section curtains are in Copenhagen blue. The roller curtains are chocolate and the carpet brown. Items of noteworthy interest in this and the following section sleeper unit are the four "tall men" berths which measure 6 ft. 8 in. long. The other berths are 1½ in. longer and slightly wider than those on conventional trains. Wide windows offer an unobstructed view to the passenger. At each lower-berth seat adjacent is placed a small mirror. An air-conditioning outlet is placed at the foot of each lower berth and is exposed only when the berth is made up.



in the "Denver Zephyr" Trains

The air-conditioning outlet for the upper berth is placed at the side of the overhead duct. These outlets are furnished with a shutter control.

The eighth and ninth body units constitute another two-unit articulated vehicle, the forward one being a 12-section sleeper and the other one containing one drawing room, three compartments and six bedrooms. The section sleeper, which has men's and women's lounges, has walls and ends in dark green-blue, and ceiling and section partitions in robin's-egg blue. Seats are upholstered in taupe with a dark-brown checkered plaid. Section curtains are Copenhagen blue. The carpet is brown and the roller curtains chocolate.

In the room car each room has an individual decorative treatment in which Flexwood is used freely with carefully selected upholstery and drapes. Each room has a small illuminated clock and is fitted for a portable radio which can be obtained from the porter. Another feature of these rooms is an electric outlet for electric razors, curling irons, or other electric appliances. There are similar outlets and clocks in all sleeper and coach wash rooms.

The tenth body unit is a two-truck, combination parlor and observation lounge car with a buffet placed mid length. The front end of this car contains 10 revolving parlor chairs upholstered in fawn. The lower walls are cocoanut brown, the upper walls are sand, and the ceiling oyster white. The draperies are brilliant rose with white stripes and the roller curtains are fawn. The floor is carpeted in a reddish brown border-line pattern in sand color with large spots of peach. At the end of the car adjoining the parlor section there is a toilet at either side. Just behind the parlor-car section is an ebony writing desk with stainless-steel legs and trim, and two card sections of four seats each.

The observation lounge contains 16 single seats and

One of the Coaches — Indirect Light from the Ceiling is Supplemented by Prismatic Lights under the Luggage Racks

three love seats upholstered in various colors and patterns. The walls and draperies are the same as those in the parlor section, but the oyster-white ceiling has stripes of tangerine. The woodwork of the chairs is silver-gray walnut. The floor is the same as that in the parlor section. The buffet is mahogany with the top of stainless steel and glass. An ornamental ceiling fixture extends from the buffet toward the rear. The large windows at the sides and the curved windows at the rear enable the passengers to see the surrounding country from all angles.

All body units in each train, including the two locomotive units, are named. The schedule of names for the two trains is shown in a table.

Construction

All car sheathing and structure, except the end underframes, needle beams and articulated end sills are stainless steel, known as 18-8. While this material is available in a wide range of physicals, those used in the construction of these cars are either high-tensile (150,000 lb. tensile strength), which is used for those parts where light-weight strength is most important, or low-tensile (100,000 lb. tensile strength), which is used where ductility or special finish is most important.

Fundamentally, the roof and under structure (floor stringers and belly side) serve as compression and tension chords of a beam. They are connected by a Pratt truss, modified as necessary for doors and windows. The longitudinal moldings serve to reinforce against localized stresses due to eccentricities. Necessary reinforcements are applied in accordance with determinations made in the analysis of the various components of the structure. In the vicinity of door openings which

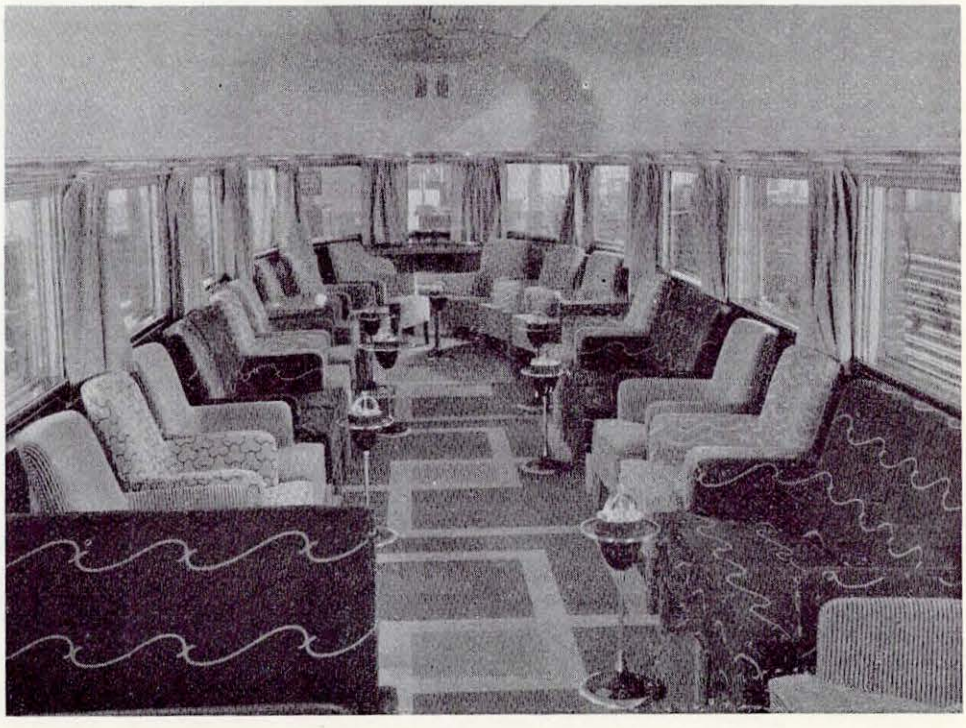
Interior of One of the Twelve-Section Sleepers

The Parlor-Car Section of the Last Car

occur between truck centers the reinforcements are in the form of additional carlines and flat sheets welded inside the corrugated roof sheets. Reinforcements of this type have proved most efficient in resisting shear at these points.

The end structure is properly analyzed to withstand buffing, traction, vertical and lateral loads that are to be expected in service and as specified by the Railway Mail Service. At the articulating joints the car body is riveted to an extended center plate made of annealed cast steel in which the side bearings are incorporated. The points of connection are amply reinforced to permit a satisfactory riveted joint, and the strength in effect tapered from this heavy casting to the light structure. The design of these end sills is such that the male casting on one car rests in a pocket in the female casting of the adjoining car and the female casting in turn rests in a pocket in the truck center plate. Vertical loads are withstood by the end truss of the car structure. The bending moment due to inherent articulation eccentricity is resisted by the sill casting, which extends into and is attached to a Cromansil needle beam and the stainless-steel center sill, and by a vertical beam extending to the roof on either side of the passageway. These vertical beams serve also as anti-telescoping members meeting the Railway Mail Service specifications for full strength. The extended attachment of these beams to the roof is designed to withstand the shear developed at the upper end of the beams.

At non-articulating ends, the under car structure consists of an end underframe made of Cromansil welded into a unit and subsequently stress relieved. The design



The Lounge at the Rear of the Train

The Dining Car Photographed by Its Own Lighting

of this unit is such that it serves as body bolster, side bearings, draft-gear housing, and end sill and center sill back to the stainless-steel center sill. This member is likewise riveted to the reinforced stainless-steel body structure.

The entire exterior is sheathed in stainless steel selected for finish. The combination of full finished paneling and bright finished moldings presents a pleasing appearance which can be maintained by ordinary shop washing. The surface is unpainted except for lettering on letter board and name plates.

The doors throughout this train are so constructed as to fit flush and present a continuation of the body appearance when closed. The rails and the fluted panels and all other moldings which are interrupted at the door opening are applied on the door so that when the doors are closed there is no apparent break in the car contour. The baggage and mail doors are suspended from an overhead track and are guided by a floor track which leads the door from a flush closed position to an open position inside the car body. Passenger doors are double type hinged on either side. In addition to the vertical split, certain of the doors are split horizontally approximately at the belt rail to permit the train crew to pick up train dispatches.

The Cocktail Lounge

The interior doors are hinged in such a way that there is no possibility of pinching, although anti-pinch plates are not applied.

Outside passenger doors are fitted with folding steps which, when not in use, are folded into the car body and present an appearance similar to the body proper. A novel feature is a light mounted in the lower riser of these steps which is operated automatically by the trap mechanism. The steps themselves are faced with aluminum Diamondette treads with a nosing of punched and formed stainless steel as a guard against slipping.

The side windows at passenger seats are of generous size. They are composed of two thicknesses of shatterproof glass with a hermetically sealed, dehydrated air space between them. This dehydrated air space precludes the possibility of condensation on the inner glass when it is subjected to temperature drop. The hermetically sealed air space cannot change its water vapor content, nor can its dust content increase. The double glazing reduced the heat transfer. All sashes are inserted in stainless-steel frames which are securely attached to the side frames with stainless-steel screws. The glass itself is cushioned from the frames by the generous use of rubber.

The insulation of the passenger cars is Flame-Proofed Dry Zero applied as blankets to fit the voids between the inner and outer walls. The side-wall material is 3 in. thick and the roof and end material is 2 in. thick. The underside of the floor over the trucks is insulated by a corrugated or undulating layer of ½-in. Thermofelt, which is retained and protected on the underside by stainless-steel sheets attached to the floor stringers.

Belly side insulation consists of ½-in. Hairinsul faced with Seisal Kraft paper, and the belly hatches are insulated with ½-in. Hairinsul protected with Mulehide. The insulation in the baggage rooms, railway postoffice and engine-roof sides and roof is Navy type Alfol applied in six layers.

The cars are fitted with automatic connectors made by the Ohio Brass Company. These connectors comprise air and steam, 220-volt power lines, telephone, control and signal circuits. They are mounted beneath the O-B Tight-Lock couplers and the semi-permanent drawbars, which are applied in place of couplers between certain cars. Tight-Lock couplers are placed between the two locomotive units, between the second locomotive unit and the first car, between the first and second cars, and between the fifth and sixth body units. The semi-permanent bolted drawbars are used between the second and third units, the seventh and eighth units, and the ninth and tenth units.

Train Power Supply

Power for air conditioning, lighting, battery charging, ventilating, blowers, refrigeration, radios, telephones and various accessories is generated by four Diesel engine-generator sets located in the first car. Each set consists of an 85-hp., 6-cylinder Cummins Diesel engine, driving a General-Electric 50-kw., 220-volt, 3-phase, 60-cycle generator.

The power from the generating units is distributed through the train by two three-wire train lines, one supplying the air-conditioning load and the other the lighting. Under normal conditions of operation the train lines are separated and supplied by separate generators, so that no flicker of the lights can be caused by the starting of air-compressor motors.

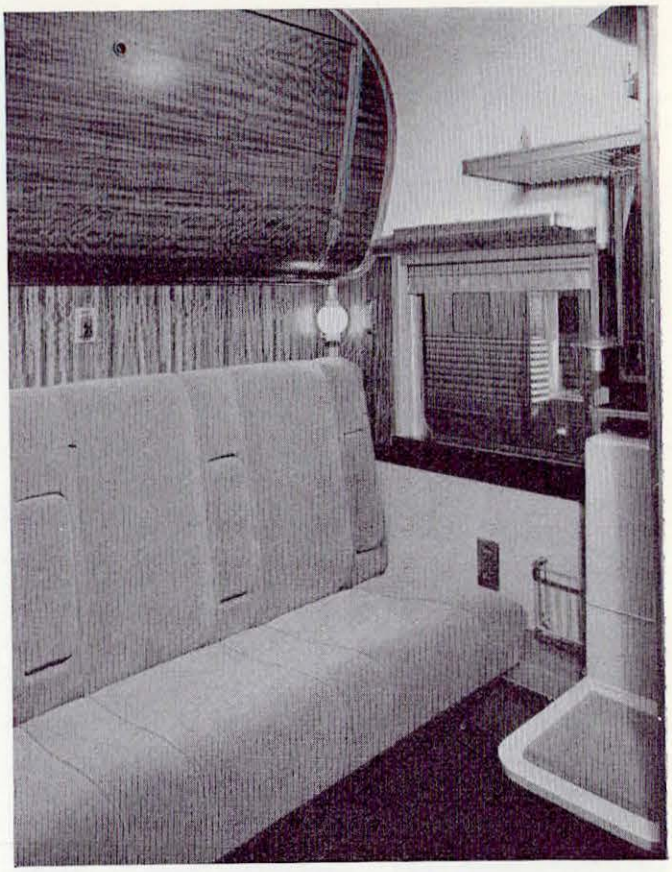
The connected load on the air-conditioning train line is about 75 kw., while that on the lighting train line is about 20 kw.

In addition, there is a two-wire battery train line. There is a 430-amp.-hr., 32-volt Exide MVAHT-25 battery in the auxiliary engine room, and another 217-amp.-hr., 32-volt, MVAHT-13 Exide battery in the eighth car. The battery train line is used for battery charging, air-conditioning and heating control, generator excitation, emergency lights, brake control and train signals.

Electrical connections between cars equipped with Tight-Lock couplers are made by the spring contacts in the connectors built into the couplers. The same method of electrical connections is used between cars having bolted drawbars. Between articulated units the electrical connections are carried from one unit to the other by flexible cables secured to studs on one body and plugs and receptacles on the one adjoining.

The connectors which form part of the couplers include two air connections, one 2-in. steam line, 11 power contacts and 30 control contacts. A drum switch which is mechanically interlocked with the air-line valves opens the control contacts which are normally energized. Separate connector isolating contactors de-energize exposed connector-line contacts when cars are separated.

Under usual conditions of operation two generators are used on the air-conditioning train line and one on the lighting train line. It is possible to put any generator on either train line, and, in any case, when two are connected together it is necessary to synchronize the second generator placed on the line. No synchroscope is required to connect the machines in parallel. When a second machine is to be put on the line it is brought up to speed by means of the engine, and when full speed is reached a centrifugal speed switch closes line contactors which connects the second machine to the bus without field. The generator has an induction or amortisseur winding, which tends to hold the speeds together. The field is then applied which pulls the second machine into step. Generator excitation is obtained from the battery.



Interior of One of the Bedrooms

Each of the four power units in the auxiliary power car includes a Leece-Neville 1,500-watt, 38-volt d. c.

Ladies' Dressing Room in One of the Sleepers

auxiliary generator. Normally the current developed by the auxiliary generators is used for battery charging. This power source may be supplemented by a motor-generator set, which derives its power from the a.c. train line. It consists of a General-Electric 220-volt, 3-phase, 60-cycle motor, driving a 5-kw., 38-volt d.c. generator.

Standby power for operation of the air-conditioning equipment may be supplied to each car separately through a Pyle-National receptacle. There is a red pilot light adjoining each receptacle, which, when lighted, indicates to the electrician inserting the plug, first, that the connection is completed and, second, that phase rotation is correct. A phase-rotation relay on the power panel in each car holds the standby power circuit open if phase rotation is wrong.

There are also a.c. standby power receptacles on the third, fourth and eighth cars, which can be used to supply power to the lighting train line feeding all essential services. Each of the two cars equipped with batteries is also equipped with Pyle-National battery-charging receptacles.

Air Conditioning

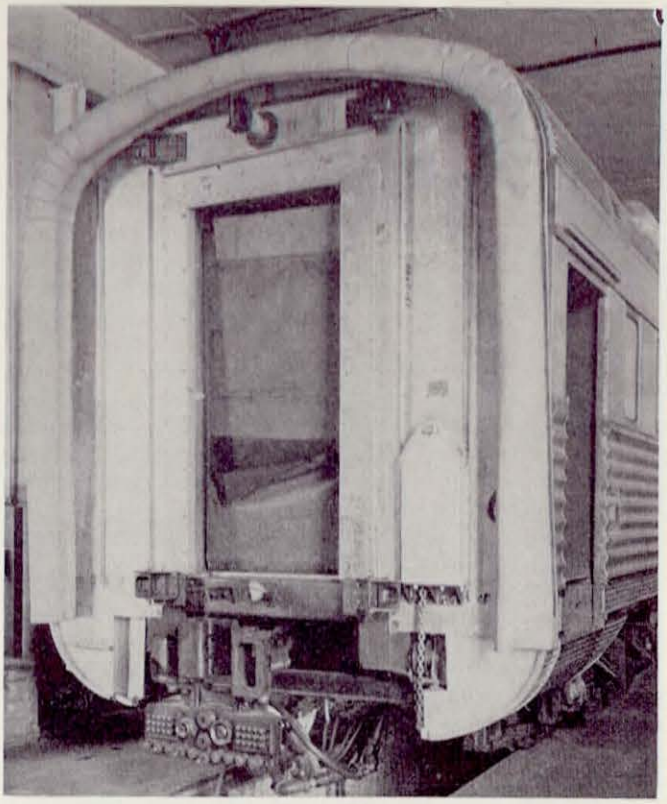
The air-conditioning equipment is as made by the Frigidaire Corporation and consists of electrically driven compressors and condensors mounted beneath the floor of the cars with overhead thermostatically

The Kitchen

controlled, combination cooling and heating units and blowers. Each of the air-conditioning compressors is driven by a 220-volt, 3-phase a.c. line-start induction motor, with a full-load current of 38 amperes and a starting current of 166 amperes. A device called a program starter makes it impossible for two or more motors to start simultaneously.

The air distribution is accomplished by openings in overhead ducts. The coaches, lounges, dining car and parlor car are fitted with overhead air ducts which deliver the conditioned air through an opening between the false ceiling and the underside of the lighting duct. The ducts are provided with vanes and other means for controlling delivery of air. In the section cars conditioned air is delivered by openings in the underside and on the side of the overhead ducts and, in addition, the air is conveyed to the lower berth by ducts built into the section headboards.

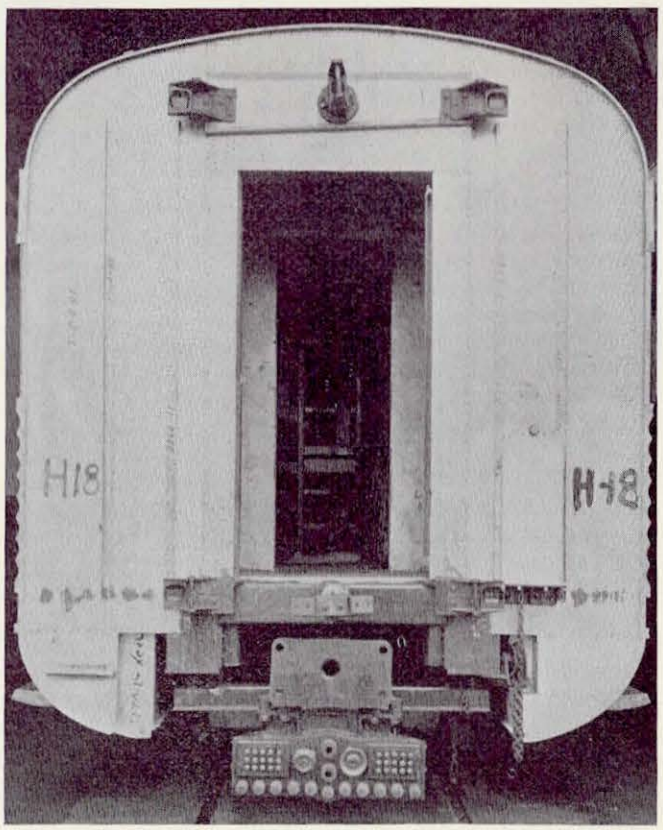
Filtered fresh air for the air-conditioning system is



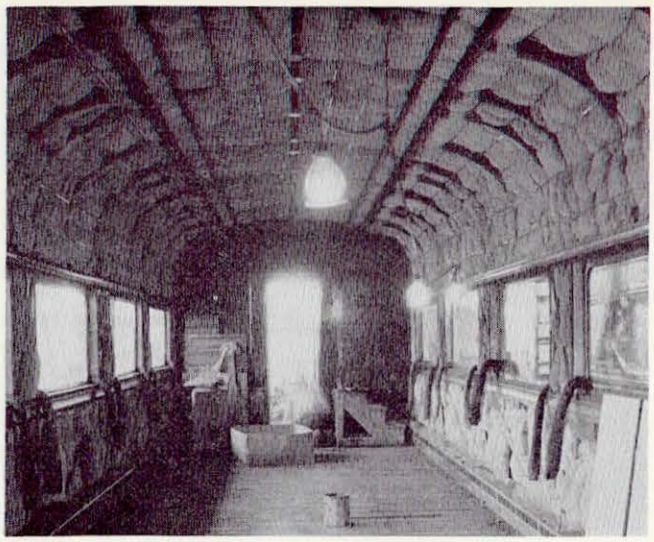
End of a Car—the Inner Diaphragm Is Not Yet in Place

taken through openings in the sides of the car roof. Side-wall radiators, under thermostatic control, are located close to the floor. The thermostatic control of the overhead and floor heat and cooling equipment is similar to existing installations on air-conditioned cars.

The kitchen ventilation comprises an air curtain to



A Semi-Permanent Drawbar Connection



Application of the Insulation

prevent kitchen odors from reaching the dining room, and three large Safety overhead exhaust fans. The air curtain is formed by outside air, taken through a grilled opening in the roof side, which is directed across the pantry-dining-room doorway in a layer from a duct constructed on either side of the doorway. The exhaust fans draw only a small amount of conditioned air from the dining room in excess of the air from the curtain.

Despite the lack of perceptible drafts the circulation of air in these cars is complete every two minutes. Enough fresh air is taken in during the operation of the air-conditioning equipment to provide a change of air in approximately seven minutes.

Lighting

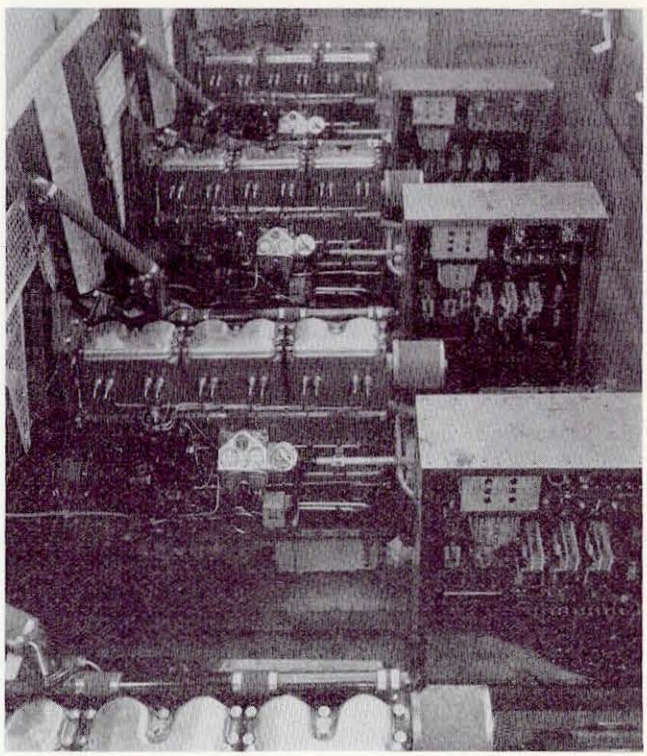
Thirty-two-volt lighting is used throughout the train. There is a 5-kv.a. single-phase transformer in each car. These transformers are connected over the three phases of the lighting train line, so as to balance the load in each phase. In addition to the 32-volt secondary for lighting, the transformers have a 110-volt tap which supplies outlets in washrooms, drawing rooms, bedrooms and compartments for electric razors, heating pads, curling irons, etc.

Emergency lighting is supplied from the battery. In case there is no 220-volt a.c. power available, a relay connects certain interior car lights, passageway lights, markers, etc., to the d.c. train line. When the a.c. circuits are again energized the relay is restored automatically to its former position and all lights are again operated from the ac. power source.

All cars but sleepers and the observation-lounge section of the rear car have general indirect lighting provided by lighting troughs on either side of the central ceiling air-conditioning duct. The troughs are equipped with 25-watt lamps on 10-in. spacings, where the light is not augmented by baggage-rack fixtures.

Baggage-rack fixtures are used in coaches and in the parlor section of the rear car. These are Safety Car Heating & Lighting Company fixtures, having double prismatic light distribution control and individual toggle switches. There is one 25-watt lamp in each unit and there is one unit over each coach seat or over each chair in the parlor section. Where baggage-rack fixtures are used the ceiling ducts have 15-watt lamps on 15-in. centers.

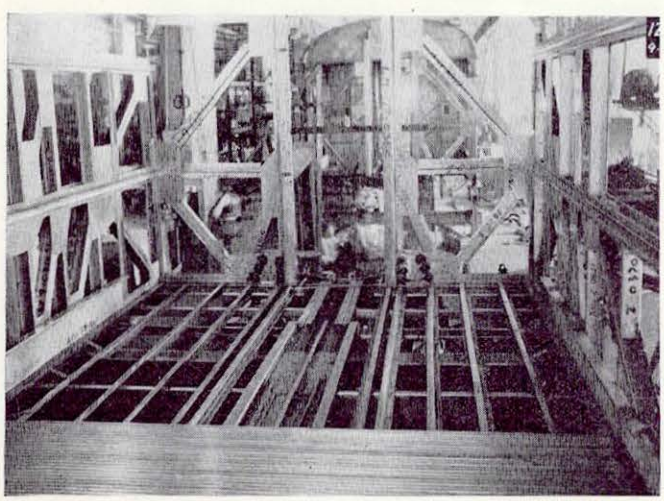
Luminator lens-type lighting units with 25-watt lamps are used in passageways, vestibules and in some washroom locations.



Four Diesel-Generator Sets Carry the Auxiliary and Lighting Loads

Two new types of Safety fixtures are used in the sleepers. The ceiling lights consist of an inverted white bowl, in which the light source is concealed by a longitudinal aluminum strip or band. Glass risers on either side of the band further diffuse the light. The unit is equipped with a 75-watt lamp.

The lower-berth lamps are also novel in form. They are spherical and are made of opal glass with a clear-glass circle or lens to furnish localized intensity for reading. One of them is fitted with a blue night light controlled by a toggle switch under the window sill. Each light has its own toggle switch for its 25-watt white light. The upper berths have two 15-watt fixtures of semi-spherical opal glass. The floor is lighted by aisle lights placed between alternate pairs of sections and staggered on opposite sides. Edge-lighted symbolic glass signs at the ends of the car show the location of



Details of the Frame and Floor Structure

men's and ladies' washrooms. In the washrooms there are lights over the mirrors, and in the ladies' rooms there are four column lights on either side and between sections of the dressing-table mirror. The rooms in the bedroom car have ceiling, mirror and berth lights.

The observation section of the rear car has diffused lighting fixtures, making continuous cove lighting over the windows. These cove lights are fitted with double 25-watt receptacles on 20-in. spacing. General lighting and lighting decoration is provided by a central ceiling light of molded flashed opal glass. It is semi-cylindrical in form and is made in ribbed sections which provide a continuous line of light. The light source consists of Lumiline lamps. Sixteen vertically mounted Lumiline lamps are also used to light the rear sign.

Braking

The operating brake is Westinghouse Air Brake Company's electro-pneumatic modified H.S.C., operated by air pressure supplied by the locomotive and controlled by electricity. The trains are equipped with retardation controls which function at four selected speeds and operate in conjunction with speed-control governors on the second and tenth trucks behind the locomotive. The large air reservoirs are made of stainless steel and the smaller ones of aluminum. In order that full advantage of this braking system may be taken the third and seventh body units are furnished with sand boxes and sanders. These sand boxes are placed at the rear of lockers in these cars and occupy space which is usually of little value. The filling door is on the outside panel and they can be filled by bucket or hose.

The communicating signal is electro-pneumatic up to the first car in which is placed a solenoid valve to reduce the pressure and to operate a charged signal pipe in the tractor unit. Push buttons are located throughout the train in vestibules and similarly important locations. In the table of the rear car there is a control box in which are train-signal push buttons, a back-up control valve, switch for the back-up light and valve for the back-up horn. This equipment is normally out of sight under the table top, but an easily operated trap door presents the entire set of controls for each operation.

All car piping is of copper tubing. The piping on the trucks is extra-heavy wrought steel. The staffless wheel type hand brakes are installed in vestibules of each train unit. These are so placed that only the wheels are exposed to passenger view. The wheels are finished in white bronze in harmony with the metal interior trim of the cars.

Trucks

All car trucks are four-wheel, equalized swing-bolster type with 33-in. wheels on 8-ft. centers. Each truck is furnished with four hydraulic shock absorbers to dampen the lateral swing action. The vibration and sound-deadening is controlled through the generous use of special low cold flow rubber at strategic points. The journal bearings are made by the Timken Roller Bearing Company and are provided with a special housing cover where the speed-control drive is taken. Castings are made of nickel steel, double annealed and drawn, and equalizers, spring-hanger safety straps, crossbar and swing hangers are made of forged steel.

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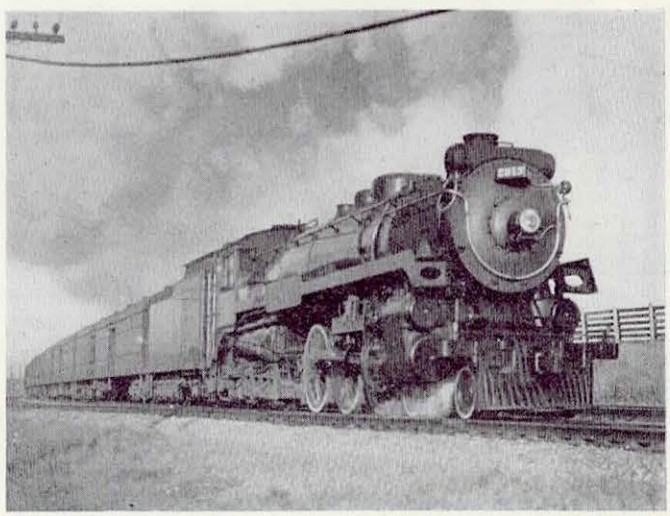


On the Canadian Pacific near Ste Anne de Bellevue, Que.

Partial List of Specialties on the Chicago, Burlington & Quincy Denver Zephyrs

Diesel engine	Electro-Motive Corp., Cleveland, Ohio
Auxiliary power plant	General Electric Co., Schenectady, N. Y. Cummins Engine Co., Columbus, Ind.
Stainless steel	United States Steel Corp., Pittsburgh, Pa. Youngstown Steel Corp., Youngstown, Ohio Allegheny Steel Co., Brackenridge, Pa.
Underframes	Lukenweld, Inc., Coatesville, Pa.
End sill castings and truck castings	General Steel Castings Corp., Eddystone, Pa.
Wheels and axles	Bethlehem Steel Co., Bethlehem, Pa.
Rubber parts in trucks	United States Rubber Products, Inc., New York
Side bearings in truck	A. Stucki Co., Pittsburgh, Pa.
King pins in trucks	W. H. Miner, Inc., Chicago
Tight-Lock couplers	Ohio Brass Co., Mansfield, Ohio
Shock absorbers	Houde Engineering Corp., Buffalo, N. Y.
Hand brakes	National Brake Co., Buffalo, N. Y.
Foundation brakes and springs, both elliptical and coil	American Steel Foundries, Chicago
Air brakes	Westinghouse Air Brake Co., Wilmerding, Pa.
Bearings	Timken Roller Bearing Co., Canton, Ohio
Diaphragms	Morton Mfg. Co., Chicago
Insulation	Alfol Insulation Co., New York American Hair & Felt Co., Chicago Dry Zero Corporation, Chicago Kimberley-Clark Corp., Neenah, Wis.
Air conditioning	Frigidaire Corp., Dayton, Ohio
Ventilators and exhausts	Hart & Cooley Mfg. Co., Chicago Tuttle & Bailey, Inc., New Britain, Conn.
Heating	Vapor Car Heating Co., Inc., Chicago
Insulation, pipe	Johns-Manville Corp., New York Keasbey Mattison Co., Ambler, Pa.
Lighting	Luminator, Inc., Chicago Safety Car Heating & Lighting Co., New York
Batteries	Philadelphia Storage Battery Co., Phila., Pa.
Wire	Okonite Co., Passaic, N. J.
Electrical fittings and charging receptacles	Pyle-National Co., Chicago
Floors	Armstrong Cork Co., Lancaster, Pa.
Carpets	L. C. Chase & Co., Inc., New York
Interior panels, wall and ceiling	Pantasote Co., Inc., New York Masonite Corp., Chicago
Occasional furniture and dining-room chairs	Pullman-Standard Car Mfg. Co., Chicago
Dining-room chairs	Mandel Bros., Chicago
Seats	S. Karpen & Bros., Chicago Heywood-Wakefield Co., Gardner, Mass.
Upholstery for seats	Massachusetts Mohair Plush Co., Boston
Tables, etc.	Formica Insulation Co., Cincinnati, Ohio
Rubber seats and cushions	Dunlop Tire & Rubber Corp., Buffalo, N. Y.
Window curtains	Railway Curtain Company, Chicago
Drapes	Orinoka Mills, New York
Venetian blinds	Kirsch Co., Sturgis, Mich.
Glass and paint	Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Clocks	Chelsea Clock Co., Boston, Mass.
Kitchen equipment	Angelo Colonna, Philadelphia, Pa.
Various bars	Brunswick-Balke-Collender Co., Chicago
Railway express	Railway Express Agency, New York
Mail equipment	Bethlehem Steel Co., Bethlehem, Pa.
Locks	Russell & Erwin, New Britain, Conn.
Water coolers	Henry Giessel & Co., Chicago
Water cups and dispensers	Logan Drinking Cup Co., Worcester, Mass. Individual Drinking Cup Co., Easton, Pa.
Lavatories	Crane Co., Chicago
Toilets	Duner Co., Chicago
Copper pipes and fittings	Chase Brass & Copper Co., Inc., Waterbury
Miscellaneous plumbing fixtures	Dayton Mfg. Co., Dayton, Ohio

A Denver Zephyr Two-Unit 3,000 Hp. Locomotive

Denver Zephyrs Hauled by 3,000-Hp. Diesel Locomotives

Main unit provides 1,800 hp. and the operator's cab—Booster unit provides 1,200 hp. and train-heating boilers

THE 10-car Denver Zephyr trains, a part of one of which recently made a record high-speed run over the lines of the Chicago, Burlington & Quincy between Chicago and Denver, Colo., as described in the *Railway Age* of October 31, are hauled by 3,000-hp. double-unit Diesel-electric locomotives designed and built at the LaGrange, Ill., plant of the Electro-Motive Corporation, subsidiary of General Motors Corporation. Each locomotive embodies essentially welded steel construction throughout, with a stainless-steel exterior and front end similar to the previous Zephyr trains. The locomotive consists of two units: Unit A which is 56 ft. 9 in. long, weighs 110 tons and develops 1,800 hp.; and Unit B, which is 55 ft. long, weighs 103 tons and develops 1,200 hp. The entire locomotive, therefore, is about 116 ft. long over the couplers, weighs 213 tons and develops a total of 3,000 hp., exclusive of auxiliaries.

Locomotive Unit A houses two EMC 900-hp. Diesel-electric power plants, complete with auxiliaries, batteries, air compressors and sufficient fuel capacity to make this unit wholly independent. All electric generators and driving motors were furnished by the General Electric Company. The cab or operator's compartment is located in the forward end, the cab floor being elevated to furnish an unobstructed view of both sides of the track. The cab is divorced from the main engine room by an insulated steel partition with doors. An outside entrance door is also provided on each side of the cab. Cab equipment consists of an operator's control station complete with all necessary controls for operating the locomotive, brake valves, sander valve, instrument panels, switches, cab heater, and adjustable upholstered seats for engineman and mechanician. All cab windows and doors have shatterproof glass. There are air-operated windshield wipers and window defrosters on the front windows.

Back of the cab is the main power plant compartment. Air intake grilles are located at the front end above the operator's cab and on each side of the unit at the rear end of the engine compartment, close to the roof line, to permit the entrance of clean air to the engine-cooling blower fans. In order to prevent any possible accumulation of snow, moisture or dirt in the high and low voltage cabinets, all of this equipment is enclosed in a large steel cabinet. Each of the 900-hp. power plants is entirely separate and complete, and may be operated separately should occasion require. An O-B Tight-Lock coupler is provided between the two locomotive units. However, all electrical, air, water and steam connections are of the usual conventional design.

Locomotive Unit B houses one EMC 1,200-hp. Diesel-electric power plant complete with auxiliaries, battery, air compressor, two heating boilers and sufficient fuel and water capacity for the service for which this unit was designed. Air intake grilles are located on each side of the rear end of the unit, close to the roof line, to provide for the entrance of clean air for cooling the engine. This unit has a hostler's control station to permit turning at terminals. A toilet for the train crew is also incorporated in this unit.

The locomotive body-framing construction is of a new welded-steel type, patterned more nearly after a Howe

truss bridge than conventional designs. There is no center sill, buff and drag stresses being transmitted to lower chords of the side trusses through beams which take the place of the end sills of ordinary construction. The members of each truss are connected top and bottom with large gussets, and are welded together in one unit, especial care being taken in the design to permit longitudinal welds only. Where the frame members connect with the trusses, gussets develop the full value of the members. At body bolsters and at each end of the roof hatches, in addition to the end frames, extremely strong arches are provided of sufficient strength to take care of torsional stresses when jacking up the locomotive body at diagonally opposite corners.

The floor and all equipment are supported on the bolsters and on cross members carried by the side trusses. Outside sheathing is also supported on the trusses and carries no part of the body stresses. Un-

One of the 900-Hp. Diesel Engines in Unit A of the Locomotive

usual collision resistance is provided by making the lower chords of the side trusses the same height above the rail as the line of draft. The front end sill, 5 ft. deep and extending down to within 15 in. of the rails, presents in collision a low, solid ram, well adapted to clear any ordinary obstacle from the track without damage to the train.

Material used in the locomotive body construction consists of high-tensile, carbon-molybdenum steel in all members where the section size is determined by stress, either actual or arbitrary, to meet the specifications of main-line railway mail service. Members in which the sections are determined by the necessity for stiffness and not stress are made of mild carbon steel. The locomotive body, exclusive of power plant and outside finish, weighed 30,000 lb. and stood a static test of twice the normal load with only twice the normal deflection of .125 in. The outside finish is stainless steel to conform with the design of the revenue cars, built by the Edward G. Budd Mfg. Co., for use in the rest of the train.

All trucks are four-wheel power trucks of EMC design, equipped with Commonwealth alloy cast-steel frames, tested in the rough to 2½ times their normal load. Equalizers, made of special steel, stood a drop test of 2,000 lb. from 54 ft. without rupture. Wear plates, provided where necessary in the truck design, are made of high-manganese carbon steel. The Bethlehem 36-in. heat-treated multiple-wear steel wheels have 1 in 40 straight taper treads, ground after application to the axles, which have the same general dimensions as the E-12 axle, with 6½-in. by 12-in. journals mounted in Timken roller bearings. The trucks are equipped with Simplex clasp brakes, there being four brake cylinders per truck, with Westinghouse automatic slack adjusters connected on each side of the truck so that a hand-brake equalizing lever placed at one end of the truck will apply the brakes on all of the wheels. There are two 18-in. brake shoes per wheel. Houdaille double-acting shock absorbers are installed on all trucks between the bolster and the truck transoms.

Details of the Power Plant Equipment

The power plant equipment of locomotive Unit A consists of two 12-cylinder V-type, 900-hp., 2-cycle Diesel engines, each direct-connected through a flexible coupling to a d.c. generator of sufficient capacity to transmit continuously the rated output of the engine to the traction motors under all conditions for which the locomotive was designed. Power plant equipment of Unit B consists of one 16-cylinder V-type, 1,200 hp., 2-cycle Diesel engine direct-connected through a flexible coupling to a d.c. generator.

The power produced by the prime mover is delivered to the driving wheels through an electrical transmission consisting of generator, traction motors, and control apparatus. Each engine has its own independent transmission equipment, the only interconnection between these transmissions being in the control.

The main engine is cranked by motoring the main generator. Special starting fields, incorporated in the generator, are connected to the storage battery through magnetic contactors which are operated by a push button switch located at the control station.

There are four traction motors, two per truck, in each unit of the locomotive which are geared to the driving axles and supported in the truck frames by spring-nose type suspension. Motors of the 1,800-hp. unit are forced-draft ventilated, air being supplied by centrifugal blowers driven by the main engines. Motors of the 1,200-hp. unit are of the self-ventilating type, air being supplied through ducts from the power plant compartment.

The control station, which is located in the cab, has but two levers, one for controlling the forward and backward movement of the locomotive, the other being the main throttle which regulates the engine speed and thereby the speed of the locomotive. All three power plants are operated from one control station by means of the EMC multiple-control system. No controller is necessary to regulate the supply of current to the traction motors, as this control is entirely automatic, the transition of the traction-motor connections being accomplished at the proper time by a specially-designed power switch.

Auxiliary equipment for each of the three engines consists of an auxiliary generator for main-generator excitation, charging the battery, operating locomotive lights, fuel pump and control equipment, etc., a mechanically driven air compressor and air intake fans. A 32-cell MVAH 25-plate Exide Ironclad battery is furnished with each unit to supply power for engine starting, transmis-

(*Continued on page 688*)

I.C.C. Approves C. & D. in East

Requires, however, that minimum rate be increased from 30 to 45 cents—Allowances to shippers who do own hauling

WASHINGTON, D. C.

PICK-UP and delivery service on less-than-carload freight now being performed by several eastern railroads and the proposals of the eastern roads generally, as well as certain water carriers, to broaden the service so as to make it substantially universal in application in Official Classification territory were found justified by the Interstate Commerce Commission in a report and order made public on October 30, except insofar as a minimum rate less than 45 cents per 100 pounds is applied and proposed, and insofar as the proposed schedules fail to provide for payment of allowances to consignors and consignees using Inland Freight Station No. 1 at New York City.

The report and order were issued following a general investigation of the plan now in effect instituted by the commission on June 1 after it had suddenly suspended the new tariffs filed by the eastern roads generally to become effective on April 1.

The commission's authorization extends also to the allowance of 5 cents per 100 pounds to consignors or consignees who make their own arrangements for pick-up and delivery, proposed in the suspended tariffs but not in effect at present in the East.

Setting aside the suspension of the new tariffs, which had been held up until November 1 upon protests of truck operators, but which had later been voluntarily deferred by the railroads for an indefinite period, the commission's order now requires the roads to establish and put in force on or before December 21, upon not less than 10 days' notice, a rate of not less than 45 cents per 100 pounds on shipments accorded pick-up and delivery. The decision and orders were considered by a committee of Official territory carriers on November 2, when it was concluded that the tariffs which had been under suspension would be supplemented to conform to the commission's findings effective November 16, on 10 days' notice.

The principal issues in the case were the questions as to whether the railroads should be required to obtain certificates as common carriers by motor vehicles before furnishing the collection and delivery service, the propriety of the allowance, and as to whether the existing rates were too low for the additional service.

Three members of the commission who are sometimes called "motor-minded" because they constitute Division 5, to which the commission has assigned matters pertaining to regulation of motor vehicles, and because of some of their decisions in previous cases, failed to agree with the majority in this case. Commissioner Lee dissented and Commissioners Caskie and Eastman dissented in part because they agreed with the conclusions of the majority on one of the principal points raised by the trucking interests, finding that motor vehicle operations conducted by the railroads within terminal areas are subject to the provisions of Part I of the interstate commerce act rather than to Part II, the motor carrier act. Commissioner Lee said the railroads had failed to comply with the provisions of Part II which are not found in Part I nor inconsistent with any of the applicable provisions of Part I, and that the commission should have found the tariffs not justified. Commissioner Eastman took occasion to write a long statement expressing the opinion that the tariffs should be disapproved and that if they were "the chances would be much improved that this important matter of less-than-carload freight would be dealt with in a constructive and really effective way." Commissioner Caskie concurred in this expression.

Mr. Eastman not only objected to the uniform allowance to shippers who elect to perform pick-up and delivery service for themselves, saying that if storedoor service is given as an optional alternative to a station service the line-haul rates should be stated on a station-to-station basis and an extra charge should be levied when pick-up or delivery service is desired, but he said the railroads had not shown the rates to be within the minimum limits of reasonableness.

The majority took the position that the tariffs, providing in effect for a reduction in rates by allowing more service for the same rates, must be approved unless there were adequate reasons for setting them aside.

"On numerous occasions in the past," it said, "we have remarked on the advantages to the shipper of store-door delivery of rail less-than-carload traffic and the economies in terminal operation which could probably be realized through pick-up and delivery service. It has been pointed out, however, that a carrier cannot be required against its wishes to furnish personal or store-door delivery of freight and that the change would have to come with carrier co-operation rather than carrier opposition. The

No Remedy Without Pooling, Says Eastman

"The railroads ought to establish universal store-door pick-up and delivery service for less-than-carload freight, and they ought to reduce many of the applicable rates. But if they are to do these things and prosper, they must organize for the efficient and economical handling of such freight. It is now handled in a crude and very wasteful way. The traffic must be greatly concentrated and expedited and much of the present station expense eliminated. The railroads know how these faults can be corrected, but their divergent interests in forwarding companies and like considerations have prevented them from co-operating in a common endeavor to that end. . . . .

"No really effective correction of the present general and great waste is possible without a much greater degree of collective effort on the part of all the railroads."

shippers' testimony in these proceedings shows that there has been no diminution in the shippers' strong desire for the service during the period in which the railroads' former attitude of reluctance has changed to a complete realization of the necessity of this service. There can be little question that the service must be supplied if the railroads are to retain their present shrunken volume of less-than-carload tonnage. The continuing reduction in this tonnage which would be likely without pick-up and delivery could only have the effect of increasing the cost on the small amount of less-than-carload traffic which would eventually remain on the rails.

"There is general agreement among the parties that the proposal in the suspended schedules to perform pick-up and delivery service, insofar as it is not now available, with no "plus charge" is equivalent to a proposal to reduce rates, there being no difference in principle between a rate reduction and an enlargement of service at existing rates. The suspended schedules, as well as the tariffs included in the general investigation, must therefore be approved unless there are adequate reasons for setting them aside. Protestants' principal attack, as indicated in earlier portions of this report, rests on the contention that the existing rates on less-than-carload traffic for station-to-station rail transportation with pick-up and delivery by motortruck are too low to cover the cost of the total service and that accordingly the present and proposed charges for door-to-door transportation should be found to be lower than minimum reasonable charges.

Truckers' Position

"The protesting highway truckers' associations do not question the right of the rail carriers to better their competitive position by furnishing pick-up and delivery service, and in effect they concede that a certain amount of competition among all transportation agencies is contemplated in the regulatory statutes. Their chief concern is due to the belief that, because of the rates which respondents would apply in connection with their proposed service, protestants would suffer from an unfair or destructive competitive practice of the kind which the Motor Carrier Act was intended to prevent. The unfair competition would be brought about, as protestants contend, by the inadequacy of the existing eastern class rates to cover the additional cost of pick-up and delivery service, particularly the rates for distances of 200 miles and less.

"The rates prescribed in *Eastern Class Rate Investigation, supra,* were fixed as maximum reasonable rates, and respondents are of course permitted some latitude in electing to accept less compensation than would be afforded by those rates."

The trucking association at the hearing had presented an estimate that the aggregate cost of the service to the Class I carriers in the eastern district would amount to nearly $15,000,000 a year but the commission declined to accept these cost figures. It also said that "the fact that respondents are here proposing a service which will add to their transportation costs, while in *Emergency Freight Charges, 1935, supra,* they sought an increase in their freight rates, is not necessarily inconsistent, as protestants contend, for rates, or a service, that will not move the traffic warrants an attempt to secure some revenue either by reducing the rates or improving the service if such can be reasonably accomplished." The commission also accepted the view of the railroads that "other prospective operating economies also will be made possible through the universal application of the service, as respondents' evidence indicates." However, it added that:

"This cost evidence indicates unmistakably that much traffic on which pick-up and delivery is accorded at existing rates is being handled at a direct out-of-pocket loss which must be made up by the revenue from other kinds of traffic. It also appears that such a situation can hardly fail to be detrimental to the highway motor carriers with whom respondents are in competition. The evidence in this record indicates that the economy and efficiency of the motortruck in the shorter distances, for example, up to 100 miles at least, has been definitely established, as shown by the small percentage of shipments for the shorter distances which the railroads have been able to recapture through pick-up and delivery. The performance of rail service at less than cost necessarily throws an unfair competitive burden on motor carriers and is not in harmony with the spirit of the Motor Carrier Act. We are of opinion that the minimum rate to be observed in connection with respondents' pick-up and delivery service should be not lower than 45 cents."

The Present Situation

At present pick-up and delivery service without an allowance is in effect to a limited extent in official territory at points on lines of the Boston & Maine, the Maine Central, the Pennsylvania, the Erie, the Grand Trunk Western, the carriers in the Pocahontas region, and certain others. The service with an allowance is also accorded by the principal western and southern rail lines, some of which serve points on the border between official territory and the other territories. A proposal to establish this service generally throughout official territory, with allowances to shippers who perform their own service, was embodied in tariff schedules filed to become effective April 1, 1936. Upon protest of the American Trucking Associations, Incorporated, the Merchant Truckmen's Bureau of New York, N. Y., and a number of other associations of highway-truck operators and of local truckmen, these schedules were suspended until November 1, 1936. Later, the principal respondents in the suspension proceeding filed schedules to become effective May 25, 1936, proposing pick-up and delivery service without an allowance to shippers, in the hope of narrowing the issue to the question of the lawfulness of the allowance. These schedules were also suspended until November 1, 1936, upon protests from truck operators.

The tariff of the eastern railroads filed to become effective April 1, 1936, and to expire March 31, 1937, unless sooner canceled, changed, or extended, in its general plan is similar to the one governing the present service of the Pennsylvania, the Erie, and certain other lines, the most important departure being the removal of all plus charges now applied in connection with hauls above 260 miles and the provision for payment of 5 cents to consignors and consignees who elect to make their own arrangements for pick-up or delivery service on shipments delivered or accepted at the carrier's freight station. Application for such allowance must be made by the consignor or consignee within 60 days from the date on which the service is performed, supported by a statement of the shipments involved. The allowance is payable only when a highway vehicle is used in the pick-up or delivery. The list of commodities excepted from pick-up and delivery was broadened in the suspended tariff to include additionally automobiles, container car freight, exhibits, milk and certain other dairy products, peddler-car traffic, and plate glass in packages of specified dimensions. The suspended tariff bearing May 25, 1936, as its effective date appears to be identical with the earlier tariff except for omission of the provisions relating to the allowance.

Substantially all standard railroads commonly classed as official-territory lines, and many short lines and electric railways, are parties to the tariff of May 25. This is also true of the tariff of April 1, except for the significant exception of the Boston & Maine, the Maine Central, the Bangor & Aroostook, and several New England short lines, which do not favor the payment of allowances to shippers. The principal coastwise steamship lines operating along the Atlantic coast also filed tariffs intended to become effective April 1, providing for pick-up and delivery service in transporting their rail-water less-than-carload traffic.

Following is an abstract of the commission's report of the evidence in support of the proposed service and an excerpt from Commissioner Eastman's opinion dissenting in part:

Abstract of Report

Among shippers and students of transportation there has long been a widespread belief that the movement of less-than-carload freight from the premises of the consignor to those of the consignee should be completely under control of the line-haul carrier or carriers under some kind of pick-up and delivery arrangement, but the compelling force of competition was required to extend this conviction to railroad traffic officials, who in the past have been reluctant to assume any obligation for transportation beyond their rail terminals. At the outset of the development of motor transport the adaptability of the highway motor-truck to a unified transportation service from store door to store door gave the motor carriers an important advantage which shippers quickly recognized. The inroads of these carriers on their less-than-carload traffic forced railroad officials to give thought to the establishment of equivalent service through arrangements for pick-up and delivery to the extent deemed necessary to meet the motor competition.

Respondents' Evidence

Traffic.—Respondents' object in establishing pick-up and delivery is to arrest the decline in their less-than-carload traffic, which they believe to be due to the development of motor transportation. In 1920 the class I railroads of the United States originated 53,202,296 tons of less-than-carload freight, and in 1935 their originated tonnage of this traffic was 14,036,154 tons, a decrease of 74 percent. Respondents see a casual relation between this decrease and the increase in the registrations of motortrucks in the same period from 1,006,082 to 3,617,000, or nearly 260 percent. The reduction in railroad less-than-carload tonnage originated in the eastern district from 1920 to 1935 was 72 percent. Respondents consider it significant that the less-than-carload traffic of the Pennsylvania in 1934 and 1935 showed an increase over the years immediately preceding, due in their belief to the establishment of the limited pick-up and delivery late in 1933.

The revenue of the Pennsylvania from less-than-carload traffic has increased since 1933, but the less-than-carload revenues of the Baltimore & Ohio Railroad Company and the Delaware, Lackawanna & Western Railroad Company, which did not establish the service in that year, have continued to shrink, save for a slight increase in 1935 over 1934 for the Baltimore & Ohio. The Erie, the Grand Trunk Western, and the Chesapeake & Ohio also show that their respective less-than-carload tonnages and gross revenues were greater in 1934 and 1935 than in 1933, in which their record low marks for this traffic were set. The tonnage of local less-than-carload traffic of the Boston & Maine has fluctuated negligibly since 1932, and the establishment of pick-up and delivery by that carrier is stated as the reason for the halt in the previous downward trend in its less-than-carload traffic. On the New York, New Haven & Hartford, which has not had the service, the downward trend is still evident. The Central Vermont began its pick-up and delivery service in 1932, and in each of the three following years its less-than-carload tonnage was greater than in the years immediately preceding.

Respondents express the view that pick-up and delivery service is not a potent factor in attracting rail traffic for short hauls, and that it has been chiefly effective in the case of shipments moving between 50 and 250 miles. They further admit that their assumption in 1933 that 260 miles marked the limit of acute truck competition was erroneous. On the contrary, long-haul competition from other forms of transportation is said now to be increasing at an alarming extent. Respondents consider it imperative that they furnish pick-up and delivery service for hauls of all distances at the present station-to-station rates if they are to compete successfully with the highway carriers. Those respondents whose tariffs are under suspension in this proceeding also complain of unequal competitive conditions with respect to other railroads at border points such as Washington, St. Louis, Chicago, and Norfolk, where the service is now furnished by the southern and Pocahontas railroads.

Operation.—Respondents generally do not operate their own motor vehicles in their present pick-up and delivery service but employ trucking concerns to perform this service for them in accordance with written contracts. These concerns have an independent legal status and act as agents for the railroad company, which, as the principal, assumes full common-carrier responsibility for the complete transportation from store door to store door. The same plan would be followed in the proposed service covered by the suspended tariffs. In some instances the trucking concerns are controlled by the railroad company or are affiliated with it through common control, notable examples being Scott Brothers, Incorporated, controlled by the Pennsylvania, for which it does trucking at Philadelphia, the United States Trucking Corporation, a member of the same corporate family as the Erie, for which it does trucking, and the Boston & Maine Transportation Company, a subsidiary of the Boston & Maine.

The Pennsylvania now has contracts with 849 trucking concerns, which are engaged in its service at the 1,282 agency and 120 non-agency stations at which pick-up and delivery service is now available. These concerns operate approximately 4,800 pieces of equipment in this service. There is no uniformity with respect to the number of truck operators employed at individual points. The Pennsylvania employs eight at Philadelphia, and three at New York. At many points only one trucking concern is employed. At some common points one trucking concern is employed by two railroads. It is the policy of the Erie to use one such concern at each point except in the larger cities, including New York, where two are under contract. The same policy is followed by the Boston & Maine, which has contracts with three truck operators at Boston, two each at Worcester, Mass., and Portland, Maine, and one each at other points. The western carriers have a different plan at Chicago and St. Louis. At the first-named city these lines enter into contracts with any truck operator who conforms to certain qualifications set up by a committee composed of representatives of various railroads, and nearly 300 truck operators have thus been enabled to participate in the pick-up and delivery service. The situation at St. Louis is similar, and there some 70 or 80 truck operators have railroad contracts.

The amounts paid for this truck service also vary widely. At all points in eastern territory, except the larger cities, the compensation to the truck operator is 5 cents. The highest amount paid is 16.5 cents which the Pennsylvania and certain other respondents pay for service on Manhattan Island, New York City, and for the longer hauls at Chicago. At St. Louis the price ranges from 8 to 10 cents, and at Pittsburgh, 10 cents. At Philadelphia 10 and 11 cents is paid, differing as to railroad. At Chicago the charges are zoned, being 9 and 10 cents, 11 and 12 cents, and 13 and 16.5 cents according to distance, the higher amounts being those paid by the Pennsylvania. The charge at Boston is 9 cents, at Buffalo, 8 cents, and at a number of other cities, 6 cents.

A considerable amount of evidence was offered by respondents for the purpose of showing the operating economies which are expected to result from universal pick-up and delivery service. To a great extent these would grow out of speedier movement of freight through the terminals. The hazard of theft or damage is thereby reduced. Expedited delivery also reduces the amount of station space required for warehousing. In the larger cities the Pennsylvania expects to discontinue many freight stations which were necessary to the convenience of its patrons before motortrucks came into use in urban transportation. This change is expected to reduce the cost of terminal switching and station handling of less-than-carload traffic.

Since the present service was established the Pennsylvania

has been able to attain an average load of 6.06 tons per car in transporting less-than-carload freight, compared with an average of 3.5 tons in 1933.

Costs.—So far as the record shows, respondents have not undertaken to determine all the items of operating expense properly chargeable to less-than-carload freight with or without pick-up and delivery service, but have sought only to ascertain whether the average gross revenue per ton derived from this traffic will more than cover the additional expense incurred in handling the traffic accorded this service, the revenue above this expense being regarded as income which could not have been secured without the service. This point of view seems to be tantamount to what is commonly referred to as the added traffic theory.

For the most part respondents confine their showing of additional expense to the payments to truck operators alone, taking the position that, since their less-than-carload traffic has shrunk so greatly, an augmented volume of this traffic could be handled with a negligible amount of added out-of-pocket expense, so far as rail transportation is concerned.

The Pennsylvania has made some study of out-of-pocket expense other than trucking costs incurred in the handling of less-than-carload traffic. Recently it investigated cost of certain operations at 60 representative stations.

A large number of representatives of chambers of commerce, shippers' organizations, and individual manufacturing and mercantile concerns at various points throughout official territory presented evidence which indicates unmistakably that shippers are substantially unanimous in favoring in principle the pick-up and delivery service proposed by respondents. For 20 years or more there has been an active demand from shippers for such an adjunct to rail service, and this demand antedated the development of highway transportation which has taken place in the last decade. This development has largely caused shippers to regard the transportation of less-than-carload traffic confined to rail movement between stations as incomplete and outmoded. In consequence, according to shipper witnesses, the railroads cannot hope to compete successfully with motor carriers for this traffic unless they can furnish a unified service from store door to store door on rates closely approximating those charged by their competitors.

Conclusions and Findings

Because of their physical limitations carriers by water and by rail have been held to be under no legal obligation to deliver freight beyond their docks and stations, but in some instances such carriers availed themselves of their recognized right to so extend their service, usually under competitive compulsion.

In *Tariffs Embracing Motor-Truck or Wagon Transfer Service,* 91 I.C.C. 539, we considered the lawfulness of tariffs covering truck and wagon service used in effecting delivery of freight at off-track stations and in transferring freight between rail carriers at intermediate points. We interpreted the term "terminal facilities" in section 1 (3) of the Interstate Commerce Act as embracing motortruck or drayage transfer performed in connection with terminal services of a common carried subject to the act or with transfer of freight in transit at an intermediate point.

We have consistently observed this distinction between line-haul and terminal service with respect to the use of trucks by rail carriers subject to the Interstate Commerce Act.

Our view that the accessorial use of motor trucks in terminal service by rail carriers was part of the transportation subject to regulation under the Interstate Commerce Act received support from court decisions prior to the passage of the Motor Carrier Act.

Most of the protestants concede that pick-up and delivery service for railroad freight by motor vehicles is not essentially unlawful, but they contend that the statutory provisions governing the establishment of such service are contained in the Motor Carrier Act and that, as respondents have failed to comply with those provisions, the present and proposed pick-up and delivery service must be found unlawful. Although it appears that protestants entertain different views as to the applicability of some of the provisions of the Motor Carrier Act, they are in general agreement that, before providing the service, a rail carrier must secure or apply for a certificate of public convenience and necessity as a common carrier by motor vehicle under section 206 of the Motor Carrier Act. So far as the record shows, no respondent class I carrier has made such an application, and respondents contend that they are not required to do so.

The term "common carrier by motor vehicle" is defined in section 203 (a) (14) as meaning—

> any person who or which undertakes, whether directly or by a lease or any other arrangement, to transport passengers or property, or any class or classes of property, for the general public in interstate or foreign commerce by motor vehicle for compensation, whether over regular or irregular routes, including such motor vehicle operations of carriers by rail or water, and of express or forwarding companies, except to the extent that these operations are subject to the provisions of part I.

In the foregoing language there is clearly expressed an intention to exclude the motor-vehicle operations of rail carriers from the definition of a common carrier by motor vehicle to the extent that these operations are subject to the provisions of the Interstate Commerce Act. In making this exception Congress may be presumed to have legislated with knowledge of the court decisions previously mentioned, holding that pick-up and delivery service is within the meaning of "transportation" as defined in section 1 (3) of the Interstate Commerce Act, as well as with knowledge of our own administrative findings to the effect that, while railroad terminal service by motortruck was subject to regulation under the Interstate Commerce Act, the use of motortrucks by railroads in line-haul service was not subject to that act.

Allowances.—In some of the protests against the suspended schedules the charge of unlawfulness was grounded in part on the proposal to pay allowances to shippers. At the hearings this view was reflected to some extent in questions by counsel and statements by witnesses in the course of the testimony. It is therefore somewhat surprising that nowhere in the briefs or oral argument is it contended by anyone that the payment of allowances would be unlawful. The American Trucking Associations, Incorporated, in their protest urged that the allowances would be akin to rebates and therefore illegal, but they have apparently abandoned that contention. The Merchant Truckmen's Bureau of New York in its protest assailed the allowances as unlawful rebates but in its brief states that, if the pick-up and delivery service, to which it is strongly opposed, should be authorized, then, "in the interest of economy to the railroads and for the protection of the local truckmen the tariffs should provide as an alternative for an adequate allowance to shippers and consignees using their own truckmen." Manifestly we may not concern ourselves with the wisdom of the managerial policy which led to the proposal but must consider rather whether the allowances would be unlawful. In our opinion the meager evidence of record on this point would not support a finding that the proposed allowances would be tantamount to unlawful concessions. Stated somewhat differently, it appears that they might be aptly termed "undiscriminating rebates."

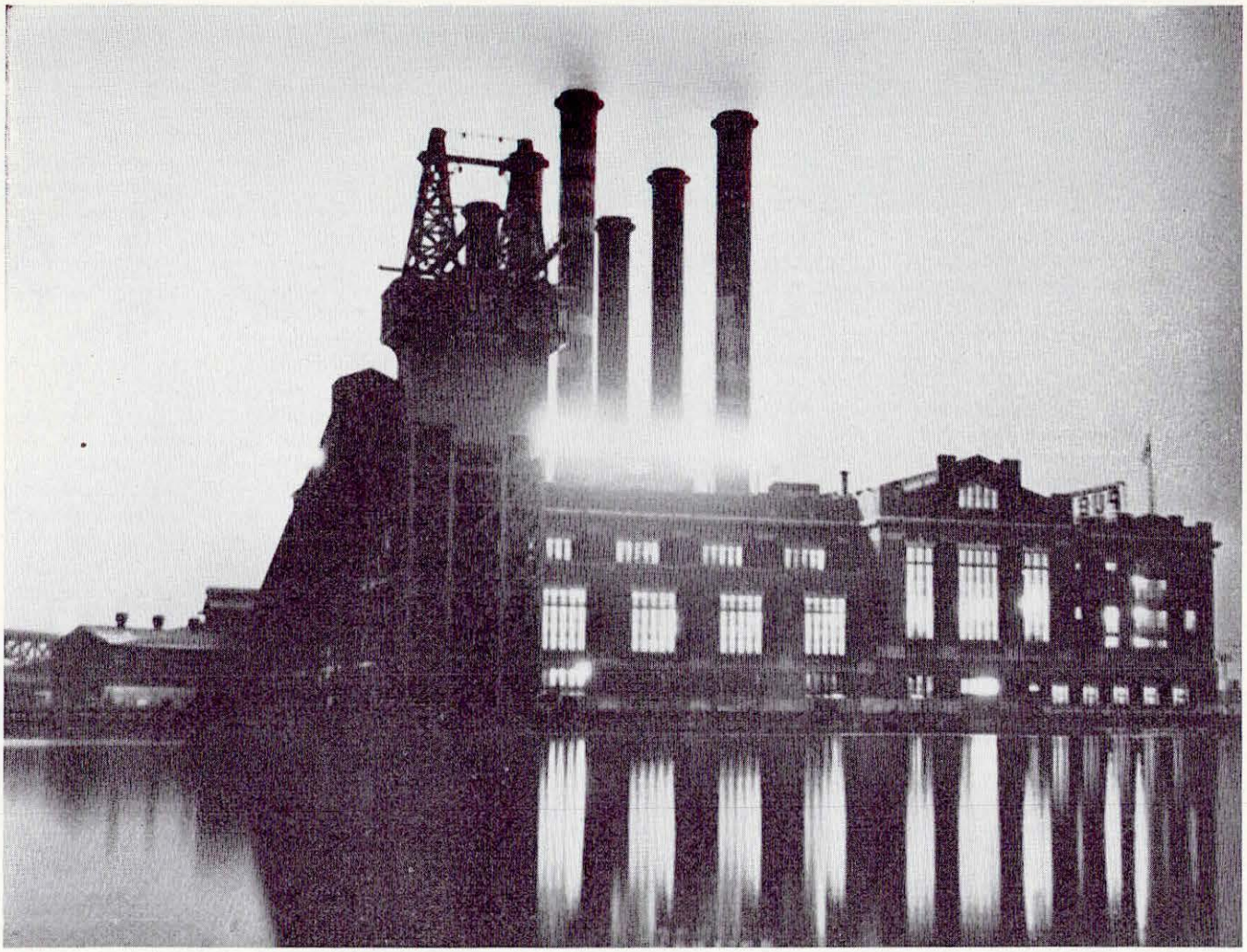
The failure of respondents to provide for the payment of allowances in connection with the Union Inland Freight Station No. 1 at New York City, in our judgment, would be unduly prejudicial to shippers using that station and unduly preferential of shippers served by other off-track stations in the metropolitan district.

Commissioner Eastman's Opinion

The comparison sustains the conclusion that less-than-carload traffic is now a class of traffic which does not yield its fair share of operating costs, taxes, and fixed charges, to say nothing of profit, and that the meager share which it furnishes would be greatly reduced under the proposed arrangement. Further and strong support for this conclusion appears in the majority report. It is there shown that if attention be confined to the fragmentary and incomplete evidence as to out-of-pocket costs presented by respondents, such expense on the traffic given pick-up and delivery service, for trucking, platform handling, and billing alone, will average 29 cents per 100 pounds, and in some cases it will reach the figure of 42 cents. For this reason the majority have decided that the minimum charge should be increased from 30 cents to 45 cents.

For my own part, while I am glad that at least this change was made, I am not persuaded that respondents have justified any part of the proposed arrangement. For the reasons which I have given, it is in need of radical revision, apart from the question of the measure of the rates in their entirety. As to

(*Continued on page 687*)



Electrical Men Meet in Joint Session

All phases of things electrical covered by Electrical Section, A.R.E.E. and Supply Men's Exhibit

A JOINT meeting, marking the twenty-fifth annual convention of the Association of Railway Electrical Engineers and the fifth biennial meeting of the Electrical Section, Association of American Railroads, was held in the Hotel Sherman, Chicago, Ill., October 27 to 29. Products of the supply companies were shown in the exhibit held by the Railway Electrical Supply Manufacturers' Association. Meetings of the two railroad groups were held both separately and in combined sessions, at one of which an address on air conditioning of passenger cars was presented by L. W. Wallace, director of equipment research, A.A.R. A summary of the reports and the discussions follows:

Joint Meetings

Illumination

The same report on illumination was presented to the Electrical Section and the Association of Railway Electrical Engineers, and this was discussed in joint session. It considers developments in incandescent lamps, includes revised lamp schedules and revisions of specifications and lays special stress on the problems involved in the illumination of railroad cars.

The improved C-5A filament headlight lamp is recommended to the attention of members. Announcement is included of improved types of mercury-vapor lamps. There is now available a 250-watt unit and the output of the 400-watt lamp has been increased from 14,000 to 16,000 lumens. These lamps have about twice the efficiency of incandescent lamps.

Concerning car lighting the report states "it is being recognized that the lighting systems which have been employed for many years are not adequate to meet the public demand for more light . . . most of the railroad car lighting is below reasonable illumination levels . . . inasmuch as the amount of power which can be produced on a car is limited, it is imperative that the

available power be used to the best advantage." The report also states that a comparison of indirect, semi-indirect and direct lighting shows their approximate efficiency rating to be, respectively, 10 per cent, 25 per cent and 45 per cent.

Some of the interior decorators are taken to task, as follows: "Since available wattage is limited, none should be wasted in purely decorative fixtures, these being notorious wasters of power as compared to the benefit to be derived from them. The question of 30-volt vs. 32-volt car-lighting lamps is raised, and the report makes apparent that the 30-volt lamp in the average 32-volt system will produce the better light with very slight increase in either power consumption or lamp cost."

Discussion—The report was presented by G. E. Kirby, electrical supervisor, Boston & Maine. G. J. Wright, manager, transportation department, Westinghouse Electric & Manufacturing Co., referred to the report as an example of 100-per-cent co-ordination between the two electrical associations. J. M. Trissal, assistant engineer, Illinois Central, said that the lighting tables appear to be a manufacturer's specification.

H. H. Helmbright, railway lighting, General Electric Company, said it is customary to review these specifications as necessary and that changes are made to include improvements in manufacture. The specifications are identical with those of the Bureau of Standards, and assist in weeding out lamps which are of inferior quality or are obsolete. E. S. M. Macnab, car lighting engineer, Canadian Pacific, asked about the use of 30-volt car lighting lamps, since, with 16-cells lamp voltage is seldom sufficient for 32-volt lamps. G. W. Wall, foreman electrician, Lackawanna, said that first impressions are important and that passengers get their first impression of lighting when the cars are standing. Under these conditions the voltage is seldom above 29 and the use of 30-volt lamps results in 20-per-cent more light by actual photometric test. The mortality of 30-volt lamps, he said, was not appreciably greater than that of 32-volt lamps, since replacements are usually made for other reasons than burnouts.

Mr. Helmbright said that Mr. Wall's viewpoint agrees completely with that of the lamp manufacturers. Mr. Macnab said the Canadian Pacific has used 30-volt lamps for 20 years. W. S. H. Hamilton, equipment electrical engineer, New York Central, said his road is now using 60-volt lamps in its new train, the "Mercury." He believes the use of lower voltage lamps should be considered as standard.

Power Plants and Power Supply

The A.R.E.E. report on power plants and the Electrical Section report on power supply were discussed in a joint session. The power plant report deals at some length with the cost of producing power in railway power plants. A survey was made of five railroad plants showing the cost of developing power, compressing air, etc., under a wide variety of conditions.

The power supply report includes a survey of power developed by steam, by water and by internal combustion engines. Section II, which deals with standby power for air conditioning and precooling of passenger cars offers the opinion that the choice of 220-volt, three-phase, 60-cycle current for right-of-way or standby power is fortunate; that it can be perpetuated, well maintained and used advantageously, regardless of any design or type of air conditioning, lighting and possibly heating equipment that may be used in future and present installations.

Discussion—The report was presented by L. J. Verbarg, air conditioning engineer, Missouri Pacific. J. A. Andreucetti, electrical engineer, Chicago & North Western, said that the operating costs shown by the several plants described in the report were not comparable because of differing costs for transporting coal. G. J. Wright, manager, transportation department, Westinghouse Electric & Manufacturing Company, said that accounting departments are reluctant to release information on the cost of transporting coal. He said that from $^{4}/_{10}$ to $^{1}/_{2}$ cent per ton mile was an estimate often used. J. H. Davis, chief engineer, electric traction, Baltimore & Ohio, expressed the opinion that the proper method was to put commercial rates into the estimate, because if power plant coal were not shipped, cars might be used for hauling it at commercial rates.

S. D. Kutner, assistant engineer, New York Central, said it was the practice of his department to use the commercial rate multiplied by the operating ratio. J. C. McElree, electrical engineer, Missouri Pacific, expressed the belief that the rates set up by the railroad should be allowed rather than the commercial rate. G. W. Bebout, electrical engineer, Chesapeake & Ohio, said it has been the practice on his road to charge $^{1}/_{2}$-cent per ton mile for hauling power plant coal.

The Electrical Section report on power supply was presented by J. H. Davis, chief engineer, electric traction, Baltimore & Ohio. He said the A.R.E.E. report contains information which the railroads have long needed and called attention to the fact that the Electrical Section was considering both its 1935 and 1936 reports. He referred to the use of intermittent low-voltage power for train-power supply, and asked if the time had not arrived seriously to consider central energy. He said there are many difficulties involved in making such a change, but that the step must be taken if greater future difficulties are to be avoided.

Electric Heating and Welding

The A.R.E.E. report on electric welding equipment and the Electrical Section report on electric heating and welding were discussed in joint session. Both reports describe a new type of direct-current welder, in which desirable welding characteristics are obtained by means of a simple design of machine. The electric welding report also discusses methods of inspection and the use of alternating-current arc welding.

The electric heating and welding report recommends the use of transformers and welding generators for thawing frozen pipes. The report states that the use of heat from torches or open flames is a difficult and hazardous proceeding, and it lists 10 fundamental requirements for satisfactory means of thawing pipes electrically. Concerning the welding of manganese steel, the report states that it cannot be successfully welded by the oxy-acetylene process, but that nickel-manganese steel electrodes have been developed which are very satisfactory for the electric welding of manganese steel. The advantage of a nickel-manganese steel for welding electrodes is that the deposit need not be water quenched.

Discussion—The A.R.E.E. report on electric welding was presented by W. F. Freutel, supervisor, train lighting, Chesapeake & Ohio. G. W. Bebout, electrical engineer, Chesapeake & Ohio, said that operators should be qualified by making test pieces. He has found that the supervisor is an extremely important man and that it is essential to have a record of each job. J. C. McElree, electrical engineer, Missouri Pacific, said great care should be used in stenciling work to avoid the starting of progressive fracture.

The Electrical Section report was presented by J. M.

Trissal, assistant engineer, Illinois Central. R. P. Winton, catenary engineer, Norfolk & Western, said that many manganese steel castings have defects and that if an attempt is made to weld over these defects the weld may fail. J. H. Davis, chief engineer, electric traction, Baltimore & Ohio, suggested that both committees establish contact with C. A. Adams, consulting engineer, 24th and Hunting Park Ave., Philadelphia, Pa., who is now probably the leading authority on welding.

Motors and Control

Two reports, motors and control and application of motors, were presented at a joint meeting of the two associations. The two reports are similar in character and some parts are identical. They deal with developments in motors and motor control and both include a study of power factor and its correction. Causes of low-power factor are given as induction motors and transformers working under light load or working on over-voltage, or having designs which cause low-power factor. The results are given as decreased capacity and consequent increased capital expenditures for generators, distributing lines, transformers and motors. The report states that it is economically feasible to correct power factor to 80 or 90 per cent, and shows how it can be brought to this value by the use of capacitors, synchronous motors and synchronous condensers.

Discussion—The report was presented for both the Electrical Section and the A.R.E.E. by C. G. Winslow, assistant electrical engineer, Michigan Central. G. W. Bebout, electrical engineer, Chesapeake & Ohio, pointed out that line shaft drives are being changed to individual drives and that this practice unloads line shaft motors with resulting lowering of power factor. It is desirable, he said, to change motors to correct this condition. Capacitors, he said, have been used in a number of cases to effect a 50- to 60-per-cent saving on investment. G. I. Wright, manager, transportation department, Westinghouse Electric & Manufacturing Co., said many studies have been made on the Reading and that in one instance a capacitor on a signal power line paid for itself in one year.

H. F. Brown, assistant electrical engineer, New York, New Haven & Hartford, called attention to the possibility of setting up a condition of resonance if power factor is corrected to 100 per cent. W. M. Vandersluis, general superintendent, telegraph and signals, Illinois Central, said that one of the most valuable uses of capacitors is to improve operating conditions by maintaining voltage at the end of long lines.

Air Conditioning of Railroad Equipment

A paper on air conditioning of railroad equipment was presented to a joint meeting of the two associations by L. W. Wallace, director of equipment research, A.A.R. An abstract of a paper follows:

Air conditioning, as thought of today, is a vigorous, developing art. It is defined by the American Society of Heating and Ventilating Engineers as, "The simultaneous control of all, or at least three of the factors affecting both the physical and chemical conditions of the atmosphere within any structure. These factors include temperature, humidity, motion, distribution, dust, bacteria, odors, toxic gases and ionization."

The atmospheric conditions within passenger cars have been a matter of concern to railroad managements for generations. It is not something about which the management has become concerned overnight.

To answer those who rather sarcastically ask why the railroads did not air-condition passenger cars years ago, an earnest effort was made 22 years ago, but it was demonstrated that satisfactory equipment was not available. Moreover, there was no real promising means of meeting the involved problem of the air conditioning of passenger cars until 1932, when Freon was made available. Then what happened? No other one industry has made greater progress in, or spent more money for air conditioning. The Association of American Railroads has authorized an extensive research program on air conditioning.

The principal objectives of the program were (1) to determine the basic practices and policies which should be adopted with respect to air-conditioning railroad passenger cars; (2) to determine what system or systems are most suitable for railway service as measured in terms of (a) capital investment; (b) cost of maintenance and operation, and (c) satisfaction and well being of passengers.

The program was initiated early in March. The actual collecting of information has been completed. The information obtained is now being analyzed preparatory to writing a report. The Division will submit a report to the Board of Directors of the Association of American Railroads prior to December 1, 1936. The program as executed consisted of three major divisions:

Laboratory—In the "hot rooms" of the Baltimore & Ohio and the Pullman Company, and the mechanical laboratory of Ohio State University, complete comparative efficiency tests were made of all air-conditioning systems and mechanical drives now used by the railroads of the United States and Canada.

This work included the testing of: 15 air-conditioning systems, as supplied to the railroads; the systems as installed in 14 railroad-owned cars, and 6 mechanical drives.

Road work—It was recognized that laboratory results, however extensive and accurate, would not give all the information required concerning air conditioning. There are numerous operating phases associated with the problem. Consequently a carefully planned road program was carried out. This was made possible by the splendid and generous co-operation of 29 railroads. Each of these railroads assigned a competent man to work with the Division.

The value of the report, in a very large measure, will be due to the able, conscientious work of these men. "I now publicly express my debt to them," said Mr. Wallace, "and gladly tell you many of them are members of the two groups jointly participating in this meeting. To name a few who have served you as officers or committeemen—G. W. Wall, W. E. Humphreys, E. S. M. Macnab, and the late T. W. Wigton." It is through the efforts of such men in the railroad service that air conditioning is so adequately meeting the requirements of the hour and through whom progress is to be realized.

Investment and costs—The third major branch of the general program was a determination of the total amount the railroads have invested in air-conditioning equipment and the cost of operation and maintenance. This phase was executed for the Division by the Department of Finance, Accounting, Taxation and Valuation. The report will show the total investment for each system and the cost of operation and maintenance of each.

In round figures, 6,900 cars have been air-conditioned at a cost of between $40,000,000 and $50,000,000 including standby-servicing equipment.

Although it appears that an entirely good job has not been done, with respect to the first cost of air-conditioning equipment, yet a remarkably good piece of work has been accomplished in providing a more habitable place for passengers. This is evidenced by the statements contained on 6,000 cards returned by passengers to the road

engineers. Something over 90 per cent of these passengers expressed themselves as not only satisfied, but highly pleased with the air conditioning in the cars being ridden.

Some typical passenger statements are:

"Air system has sold me on railroad travel in summer months."

"A wonderful contribution to train comfort."

"A privilege to travel in such comfort."

"Whoever is responsible for air conditioning should have a monument erected."

"Luxurious beyond the dreams of a lady of horse and buggy days."

It is believed that this series of reports to be issued by the Research Division will give a more comprehensive and objective picture of the art of air conditioning than has been available before. Notwithstanding this, there is a large amount of work ahead. Much development and refinement work is necessary before we can be content.

Electrical Section Reports

Electrolysis

The report includes a study of leakage of stray current through foundations of catenary supporting structures. Replies to a questionnaire indicate that no actual deterioration of catenary supporting structure foundations, sufficient to give difficulty, has been encountered on any electrified roads, due to the leakage of stray current through the foundations.

Concerning the general subject of electrolysis, attention is directed to a report dated January 1, 1936, prepared by the Detroit Committee on Electrolysis, entitled "Electrolysis Mitigation in the Principal Cities of the United States."

Discussion—The report was presented by J. M. Trissal, assistant engineer, Illinois Central. In discussing it, S. Withington, electrical engineer, New York, New Haven & Hartford, suggested the desirability of further information on spark gap insertion in grounded leads, expressing the opinion that more details would be of general interest.

Overhead Transmission Line and Catenary Construction

Working jointly with the A.S.T.M. and the A.T.E.A., the committee on overhead transmission line and catenary construction prepared in 1935 a new specification for bronze trolley wire. The specifications were sent out for letter ballot and adoption as a standard by A.S.T.M., in June, 1936.

The committee is also studying the subject of comprehensive wire cables and recommends (1) that the Electrical Section request representation on the A.S.A. Sectional Committee for project D-32 wire and sheet metal gages; (2) that the Signal Section, Telegraph and Telephone Section and Mechanical Division be invited to co-operate in this work through a joint committee to be appointed; (3) that the joint committee, if appointed, take such steps as are necessary to secure the co-operation of other interested groups, with a view to following the matter to a conclusion through the procedure of the American Standards Association, and (4) that if such a joint committee is appointed it take over the work of the overhead transmission line and catenary construction committee as applied to wire cables.

Discussion—The report was presented by P. B. Burley, assistant electrical engineer, Illinois Central. K. H. Gordon, foreman, electrical department, Pennsylvania, stated that negotiations with the Edison Electric Institute on wire crossing specifications are progressing, differences having been narrowed down to a single question.

Standardization of Apparatus and Materials

The report on standardization of apparatus and materials states that it is most desirable to utilize as fully as possible the standards that have been adopted under the American Standards Association. A list of standards is included with the report, and it is recommended that a complete file, kept up-to-date, of these standards be made available at Electrical Section Headquarters.

Discussion—The report was presented by K. H. Gordon, foreman, electrical department, Pennsylvania. In the discussion, a question was raised regarding the desirability of publishing standards already available elsewhere in printed form, and the answer was that the committee proposed to publish in the proceedings only a *list* of standards and not the standards themselves.

Clearances

The report of the committee on clearances for third rail and overhead working conductors includes a diagram for pantograph clearances on electrified railroads. This is offered for comments and criticisms.

A diagram, covering clearance lines for equipment and permanent way structure adjacent to third rail and for third-rail structure, was prepared in 1934 and is now awaiting approval by the Mechanical Division. The committee recommends that the pantograph diagram be submitted to the entire Electrical Section for comments.

Discussion—The report was presented by W. S. H. Hamilton, equipment electrical engineer, New York Central, who explained that the committee attempted to set up minimum normal clearances to be published as recommended practice in a progress report. With regard to clearances around third rail, as submitted in the 1934 report, the chairman reported that the Mechanical Division, which is an interested party, has not yet acted on the proposal. H. F. Brown, assistant electrical engineer, New York, New Haven & Hartford, suggested the removal of present clearance diagrams from the manual.

S. M. Viele, assistant electrical engineer, Pennsylvania, asked if the diagram is applicable to all potentials in railway electrical projects, and Mr. Hamilton replied that the clearance is adequate for 11,000 to 12,000 volts a.c. and 3,000 volts d.c. He said that the clearances could be reduced somewhat for 750 volts d.c., but as only a little of this type of construction will probably be built in the future, it is a relatively small factor. Mr. Viele stated that 6 in. clearance is not enough, especially where hot locomotive gases are present, as under bridges.

G. I. Wright, manager transportation department, Westinghouse Electric & Manufacturing Company, said that on the Reading a minimum clearance of 6 in. has been used in conjunction with steam operation and that they have had a few flashovers due to icicles, rats, owls, etc., but generally little trouble, or not enough to justify the cost of raising bridges or depressing tracks in order to provide greater clearances. Mr. Viele said that the minimum clearances recommended are generally adequate, but that under certain conditions it is desirable to provide additional clearance if there is danger of steam locomotive gases reducing the effectiveness of the insulating air spaces.

Protective Devices

The work of the committee on protective devices and safety rules in electrified territory was concerned with

safety precautions necessary when inflammable liquid is being transferred from cars to tanks or from tanks to cars or vehicles. Recommendations are made for the manner in which it is necessary to provide grounds and electrical connections to prevent sparks which may be caused by static electricity or stray currents.

Discussion—The report was presented by R. G. Gage, chief electrical engineer, Canadian National, who urged its acceptance as protection against static sparks only. Mr. Viele stated that protection must be provided for three conditions; namely, static sparks, stray currents and electrification currents. As regards the first, the recommendations are, in his opinion, adequate; second, fairly adequate; and third, not adequate. H. F. Brown, assistant electrical engineer, New York, New Haven & Hartford, suggested collaboration with the Signal Section for rules in non-propulsion territory.

Track and Third Rail Bonds

The committee on specifications for track and third rail bonds is making a study of bond design, with the view to developing specifications for welded bonds.

Discussion—In presenting the report, H. F. Brown, assistant electrical engineer, New York, New Haven & Hartford, said there was a difference of opinion concerning the use of large-size bonds applied by welding. J. H. Davis, chief engineer, electric traction, Baltimore & Ohio, said the A.A.R rail committee had approved the use of welded bonds. W. M. Vandersluis, general superintendent, telegraph and signals, Illinois Central, said that the experience of his road with welded bonds was satisfactory. Two slight cracks in the rail had been found during a period of 10 years, which may have been caused by welding and possibly by more than one application. There has been no accident.

Mr. Brown said the New Haven has used bonds and re-applied bonds but has had no broken rail. These are usually small bonds and he is of the opinion that the trouble experienced by street railway companies may be due to large bonds up to 500,000 c.m. In response to a question, Mr. Davis said either gas or electric welding may be used and that the Baltimore & Ohio has used, without trouble, bonds consisting of two 250,000 c.m. conductors, for the past 11 years, on track where there are 400 or more trains per day. In Baltimore, he said, bonds have been applied to the head of rails within the limits of the angle bars and have been found perfectly safe. G. I. Wright, manager, transportation department, Westinghouse Electric & Manufacturing Co., said the experience of the Reading shows no trouble in five years.

Substations

The subject given special attention by the committee on design of indoor and outdoor substations was the use of supervisory control, or, remote operation of switches and circuit breakers. The relatively small number of failures of supervisory control equipment is emphasized by a study made by the committee and indicates the high degree of reliability which has been attained. The record of false indications is equally reliable, and it is a fact recognized by the users that freedom from false indications is of equal importance with freedom from false operations. All companies but one report that equipment failures have either decreased with age of equipment or have not increased. The report states that this result is probably due to increased experience of the maintenance forces.

Discussion—The report was presented by H. F. Brown, assistant electrical engineer, New York, New Haven & Hartford. In substantiating the findings of the report, S. M. Viele, assistant electrical engineer, Pennsylvania, said that supervisory apparatus was very satisfactory and gave less trouble than the circuits themselves. P. B. Burley, assistant electrical engineer, Illinois Central, asked if it was practice to trust the indication of supervisory apparatus when men are to work on the line. Mr. Brown replied that no work was ever performed on a line reported dead without adequate grounding protection, whether switches were controlled manually or by supervisory control.

High-Tension Cables

Manufacturers have done much during the past several years in effecting improvements in design and manufacture of solid-type and oil-filled high-tension cables, and this work has been studied by the committee on high-tension cables. The use of two new types of high-pressure cable on the Pennsylvania, respectively, in Baltimore, Md., and Washington, D. C., are described in a supplement to the report.

Discussion—The report was presented by S. M. Viele, assistant electrical engineer, Pennsylvania. R. P. Winton, catenary engineer, Norfolk & Western, asked what protection was taken to prevent rust and electrolysis. Mr. Viele reported that the pipe containing the oil and cable was given a bitumastic coating about ⅛-in. thick. He said he was not sure of its efficacy because it tends to crack and expose small areas which are then subject to intensive electrolysis. F. J. White, electrical engineer, Okonite Company, said that while a pit might cause an oil leak, it did not affect the perfect operation of the cable.

Corrosion-Resisting Materials

The report of the committee on application of corrosion-resisting material to railroad electrical construction has been described as one of the most valuable pieces of research work done by the railroads. Many samples of metal have been exposed to accelerated and normal conditions of corrosion and the tests have progressed to the point where a definite knowledge of corrosion-resisting qualities is available. The normal condition tests corroborate the accelerated tests.

Among all of the many cylindrical-shaped specimens tested, those made of hard-drawn copper showed the lowest loss. The chrome-nickel or stainless steel pieces which had been buffed also showed no appreciable loss. The unfinished samples showed more loss, indicating that after corrosion or pitting had started further loss might be expected. It appears from the report that the surface finish of stainless steels has an important bearing on at least the early stages of corrosion. The ingot iron samples had the greatest loss and malleable iron had about half the loss of steel. The tests also showed that galvanizing retards corrosion very little.

Among the stranded conductors tested, the bronzes were very good and there was very little difference between the various types. The stranded aluminum conductors fared poorly when exposed to locomotive gases, and the stranded stainless steel conductors did not make a good showing, apparently because the surface conditions of the several strands were not good. The report also indicated that asphalt is not a satisfactory protection for overhead conductors in tunnels.

Detailed study of the report is essential to an understanding of the information obtained.

Discussion—The report was presented by R. P. Winton, catenary engineer, Norfolk & Western. In response to questions raised by J. H. Davis, chief engineer electric traction, Baltimore & Ohio, H. F. Brown, vice-chairman of the committee, said that the test made in the

Hemphill tunnel on the Norfolk & Western confirmed the results of the accelerated tests made in a smoke jack of the Cedar Hill enginehouse on the New Haven. The tests, he said, indicate that if stainless steel is kept clean it will last indefinitely, but that a film of dirt, especially soot, will start corrosion. The simpler alloys, he said, generally show the better life performance.

Election of Officers

D. B. Thompson, mechanical and electrical engineer, New York Central, was elected to the committee of direction, and a nominating committee was appointed, consisting of S. Withington, electrical engineer, New York, New Haven & Hartford; J. A. Shaw, general electrical engineer, Canadian Pacific; E. Wanamaker, electrical engineer, Chicago, Rock Island & Pacific; A. R. Walker, electrical engineer of equipment, Illinois Central, and C. R. Sugg, electrical engineer, Atlantic Coast Line. G. I. Wright, formerly chief electrical engineer, the Reading Company, who was elected chairman for two years in 1935, has resigned following his appointment as manager, transportation department, Westinghouse Electric & Manufacturing Company. H. F. Brown, assistant electrical engineer, New York, New Haven & Hartford, has been appointed chairman of the Electrical Section.

A.R.E.E. Meetings

Purchase of Electrical Energy

The committee on purchase of electrical energy suggests changes in existing power rates and schedules that will result in more unified and simplified forms. No simplified standard rates and contracts have been adopted, but rate-making bodies have given consideration to the placing of railroad rates on the same basis as certain manufacturing interests.

It is suggested that where special air-conditioning services are required only for a part of the year it is possible to have the power company discontinue service and billing during the off season. Minimum charges can frequently be reduced by the installation of double-throw switches to control the amount of horsepower which can be thrown on the line at one time. Increased demand for battery-charging services makes it desirable to check these installations for possible reduction in demand charges and more favorable rates.

Discussion—In presenting the report, G. W. Bebout, electrical engineer, Chesapeake & Ohio, said it was necessary that someone constantly watch power bills to see that the best rates and best load factors are maintained. J. C. McElree, electrical engineer, Missouri Pacific, called attention to the fact that one public utility company recently filed rates in which billing is made on the basis of demand for each month. C. G. Winslow, assistant electrical engineer, Michigan Central, supplemented this information, by stating that two companies in Michigan now have rates of that kind, which work to considerable advantage to the railroad user, as compared with rates in which demand is established for the year. R. G. Gage, chief electrical engineer, Canadian National, said the power question in Canada is a serious one, and that contracts of American utilities are better than Canadian. He endorsed the progress made by the A.R.E.E. members, which he thought would be beneficial in furthering improvements in Canada. Mr. Bebout summed up the discussion by saying it is not the intent of the committee to try to dictate to utilities but only to improve and simplify contracts.

Concerning the maintenance of Diesel-electric cars and locomotives, the report states that when the number of units in service and their geographical location will permit, it is highly desirable that general repairs be made in a separate shop by qualified mechanics. Lists of tools required for both mechanical and electrical maintenance are included. Suggestions are also made concerning the required organization of personnel. The latter half of the report consists of descriptions of the several types of control equipment available.

Discussion—The report was presented by A. R. Walker, electrical engineer, equipment, Illinois Central. He said it was the opinion of the committee that maintenance work on automotive equipment is frequently done without adequate supervision and with the result that the mechanic may do more harm than good. G. W. Bebout, electrical engineer, Chesapeake & Ohio, said that when automotive equipment was first installed on the Chesapeake & Ohio the question was raised as to whether locomotives and motor cars should be equipped with tools. It was found that there was a great difference in operators, some being willing to use tools and others not, but that one man who was competent has never had a failure. A tool box and good supervision, he said, are essential.

S. C. Morse, supervisor, rail motor cars, New York Central, said that instructing and examining of enginemen is usually done by a man familiar with steam power. Something, he said, might profitably be done to improve the road foreman of engines' knowledge of automotive equipment. E. Wanamaker, electrical engineer, Chicago, Rock Island & Pacific, said that interest in automotive equipment has increased to the point that two manufacturers are now making switchers for stock. Equipment design, he said, has been largely in the hands of manufacturers and the railroad's greatest difficulty is to learn how to maintain equipment after it has been placed in service. Engine troubles appeared first and after a considerable service period, came electrical troubles. He suggested that methods of maintenance covering inspection and repair methods should be developed and that special attention should be given to preventive maintenance rather than trouble shooting. He recommended strongly the use of the Megger as an effective means of preventive maintenance.

Application of Radio to Railway Service

Practically every major railroad in the country is now using or has used radio for entertainment purposes, and in most cases standard commercial receivers are used. The installation requires a converter having from 85- to 115-watt capacity, which receives its power from the storage batteries. There are 32-volt d.c. sets available, but the use of the converter is considered best for railway service. Filters required and the best type of antenna and lead-in wires are described.

One railroad is now experimenting with a front-to-rear, short-wave radio communication system, but development has not proceeded to such an extent that any report is available for release.

Discussion—The report was presented by W. E. Humphreys, electrical inspector, Chesapeake & Ohio. W. E. Grover, electrical supervisor, Pere Marquette, said that filters mounted inside of machines were more effective than those mounted outside for reducing noise on passenger car radios. O. M. Bixby, assistant engineer, New York Central, said that some of the receivers on the New York Central require 135 watts and are larger than those covered by the report.

In response to a question, Mr. Humphreys said it was not necessary to filter all motors, and though sometimes a thermostat will cause noise, it can be corrected by using one of the Vapor type. T. C. Wurts, heavy traction

group, transportation department, Westinghouse Electric & Manufacturing Company, said that the railroads do not show much interest toward the obtaining of a wave band for head to rear end communication, and suggested they should do so, in order that necessary bands will not be assigned to some other application.

Car Electrical Equipment

The report on car electrical equipment was again the subject of broadest interest discussed by the A.R.E.E. It includes a recommended practice for the annual inspection, respectively, of steam-ejector, mechanical, electro-mechanical and water-ice air-conditioning equipment.

Most roads are now considering the overhead heat in passenger cars as primary and the floor heat as secondary. It is recommended that manufacturers develop control equipment which will interlock the two heat sources through one selector switch.

The re-circulated air duct is a location most generally used for cooling thermostats, but in dining cars it is stated that the thermostat should be located back of the second-last grille in the air duct farthest from the air-conditioning unit, to avoid holding wrong temperatures in the car.

Clean ducts and coils are essential and from 30 to 40 per cent fresh air is desirable for the elimination of odors. Experience with deodorants has not been sufficient to indicate whether or not they should be used.

Manufacturers of pump and fan motors should give serious consideration to providing motors that are waterproof and dust-proof.

A recent check on air-conditioned generator drives shows 4,350 employing 2-in. V-belts with gear boxes, 215 having 2-in. V-belts with truck-hung generator, 153 gear-driven, truck-hung generators, 91 gear and shaft drive to body-hung generators, 325 combination flat-belt—gear box and shaft drives and 140 7/8-in. V-belt drives to body-hung generators.

A new drive, consisting of two enclosed triple chains from the axle to a jack shaft, and in turn driving the generator through bevel gears and a splined universal shaft (manufactured by the Mechanical Appliance & Transmission Company of Montreal) is described in detail.

The committee has done an excellent piece of work in setting up a recommended guarantee and adjustment agreement applying to storage batteries, which is comprehensive and complete in detail. The question of using train-line voltages higher than 32 is discussed at length, a consideration being given to the advantages and disadvantages of increased voltage as applied to various types of equipment and different operating conditions. The voltages under consideration are 32, 64 and 110-volt d.c. and 220-volt three-phase a.c.

Discussion—The report was presented by G. W. Wall, foreman electrician, Lackawanna. A. E. Voigt, car lighting and air-conditioning engineer, Santa Fe, said it is difficult to remove cooling units from cars and that he doubts the necessity if the material they are made of is rust-proof. Mr. Verbarg said that cooling coils can be cleaned in the cars if hatches are provided for the purpose. In response to a question, he said he had not found it necessary to clean the inside of the cooling coils.

This finding was confirmed by Mr. Voigt, but opposed by G. W. Bebout, electrical engineer, Chesapeake & Ohio, who said that bad water can necessitate cleaning the inside of cooling coils. Mr. Voigt said that a 4-in. filter is better than a 2-in., that too much oil in the filter is objectionable and that it can be sprayed on effectively. Mineral-wool filters require careful handling to avoid creating holes through which air may pass without filtration. W. E. Humphreys, electrical inspector, Chesapeake & Ohio, said that transformer oil is satisfactory and that filters must be cleaned every 10 to 15 days. E. Wanamaker, electrical engineer, Chicago, Rock Island & Pacific, said that the generous use of makeup air is important and that much can be accomplished by airing pillows and bedding when cars were not in service.

The section of the report on axle generators was presented by E. S. M. Macnab, car lighting engineer, Canadian Pacific. Walter Harris, department electrical foreman, Southern Pacific, said that lost V-belts must be applied quickly and that information was needed on methods of application. Mr. Wall, Mr. Macnab, and Mr. Andreucetti all reported that their roads do not try to apply belts between terminals, but rely on remaining belts to carry load.

E. J. Schmidt, chief engineer, railway division, The Dayton Rubber Manufacturing Co., said that his company has developed a new type of fastener which reduces flexing and cracking of the belts. L. W. Wallace, director, equipment research division, A.A.R., asked for information on chain drives, as used by the Canadian National. This road uses a combination of belts and chains on 3-kw. machines, the chains being used from November to the end of April and belts the remainder of the year. The chains wear badly in summer weather when dirt is not kept down by the snow, but serve effectively to keep cars lighted in the winter time. The chains under these circumstances can be made to run about 40,000 miles.

The storage battery section of the report was presented by Mr. Wall. Mr. Wanamaker said that buying battery service rather than batteries has greatly reduced their cost to the railroads. He added that the cost of distilled water is so small that it should not prohibit its use. The section of the report on 110-volt lighting was presented by Mr. Humphreys. Mr. Wall said the railroads have a great investment in 32-volt systems and any change to 110-volts would have to be gradual. The committee next year will work out costs of changing to a higher voltage. Mr. Andreucetti said that ultimately railroads will have to go to higher voltages, since loads have greatly increased and will become still greater. He believes the ultimate solution will be an alternating-current, central-energy system. He suggested that the cost study should be made to cover the change from the present system to the central energy system.

Mr. Voigt expressed a preference for the steam-ejector type of air-conditioning, since steam must also be used for heating. Mr. Wanamaker suggested that it might be possible to install a satisfactory prime mover on each car, which would supply both heating and power for lighting and air conditioning. The engine exhaust, he said, could be used through a heat exchanger, and to this could be added electric heat from the generator. Mr. Hamilton does not think the 64-volt system is as limited as the report indicates. He believes that the present insulation on 32-volt systems is not sufficient, if 150 to 160-volts is used for charging 110-volt batteries.

Locomotive Electrical Equipment

The maintenance of train control and train stop apparatus, when first installed on various railroads, brought about considerable confusion in standardizing of methods of testing when engines arrived at roundhouses or terminal points to enable the electrical forces to ascertain if the equipment was in perfect condition. A typical method of test procedure, as followed by one railroad, covering Schedule 2 Intermittent Train Stop Equipment, is included in the report.

Three drawings are included to show typical wiring

installations, respectively, for road locomotives, switching locomotives and road locomotives for double-end service.

The application of pre-focus head lamps has been increased by an installation of 20 by an Eastern railroad. A new style of socket construction has been used which makes it impossible to force the lamp out of the locked position through distortion of the front plate.

Discussion—The report was presented by C. W. Nelson, supervisor, train control and train lighting, Chesapeake & Ohio. A. G. Oehler, editor, Railway Electrical Engineer, asked for information on keeping locomotive cab windows free of ice. In some cases windows are left partially open, in others wipers are used; some railroads employ rotating window sections and still others, heaters. A device developed in France consists of a curved section beneath the window, which operates after the manner of a smoke lifter, to force the air forward and upward so that the window can be left open without causing wind in the face of the engineman. F. J. Hill, general supervisor of car electrical equipment, New York Central, said that tests are now being made on snow plows for keeping ice and snow from the plow windows. The results of these tests will be used to determine what means to employ for protecting locomotive cab windows.

Election of Officers

The following officers were elected for the ensuing year by the Association of Railway Electrical Engineers: President, George T. Johnson, assistant electrical engineer, New York, New Haven & Hartford; first vice-president, T. W. Wigton, assistant electrical engineer, Burlington Lines; second vice-president, F. E. Starkweather, electrical engineer, Pere Marquette; members of executive committee, L. J. Verbarg, air conditioning engineer, Missouri Pacific, and C. W. Nelson, supervisor, train control and train lighting, Chesapeake & Ohio.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended October 24 indicated a beginning of the usual seasonal decline toward the end of the year, amounting to 815,972 cars, a decrease of 10,183 cars as compared with the loading for the week before but an increase of 105,351 cars, or 14.8 per cent, as compared with the corresponding week of last year. All commodity classifications except grain and grain products showed increases over last year's figures and merchandise, grain and grain products, and forest products showed increases as compared with the previous week. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading

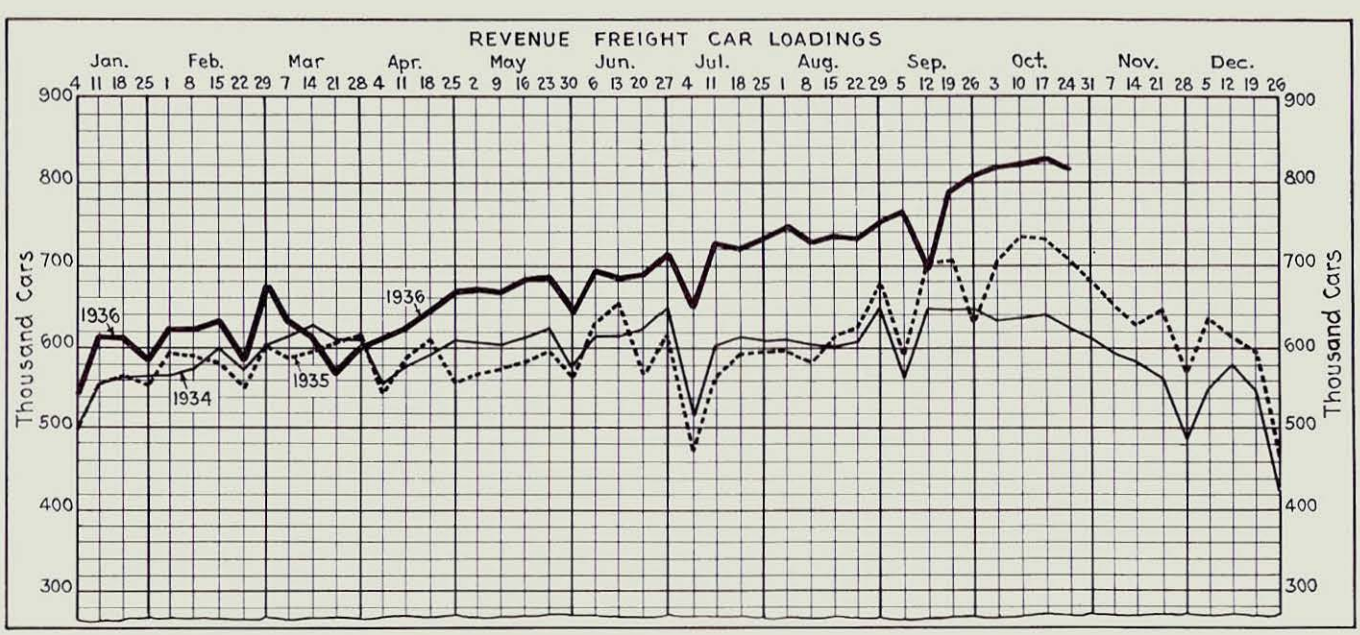
For Week Ending Saturday, October 24

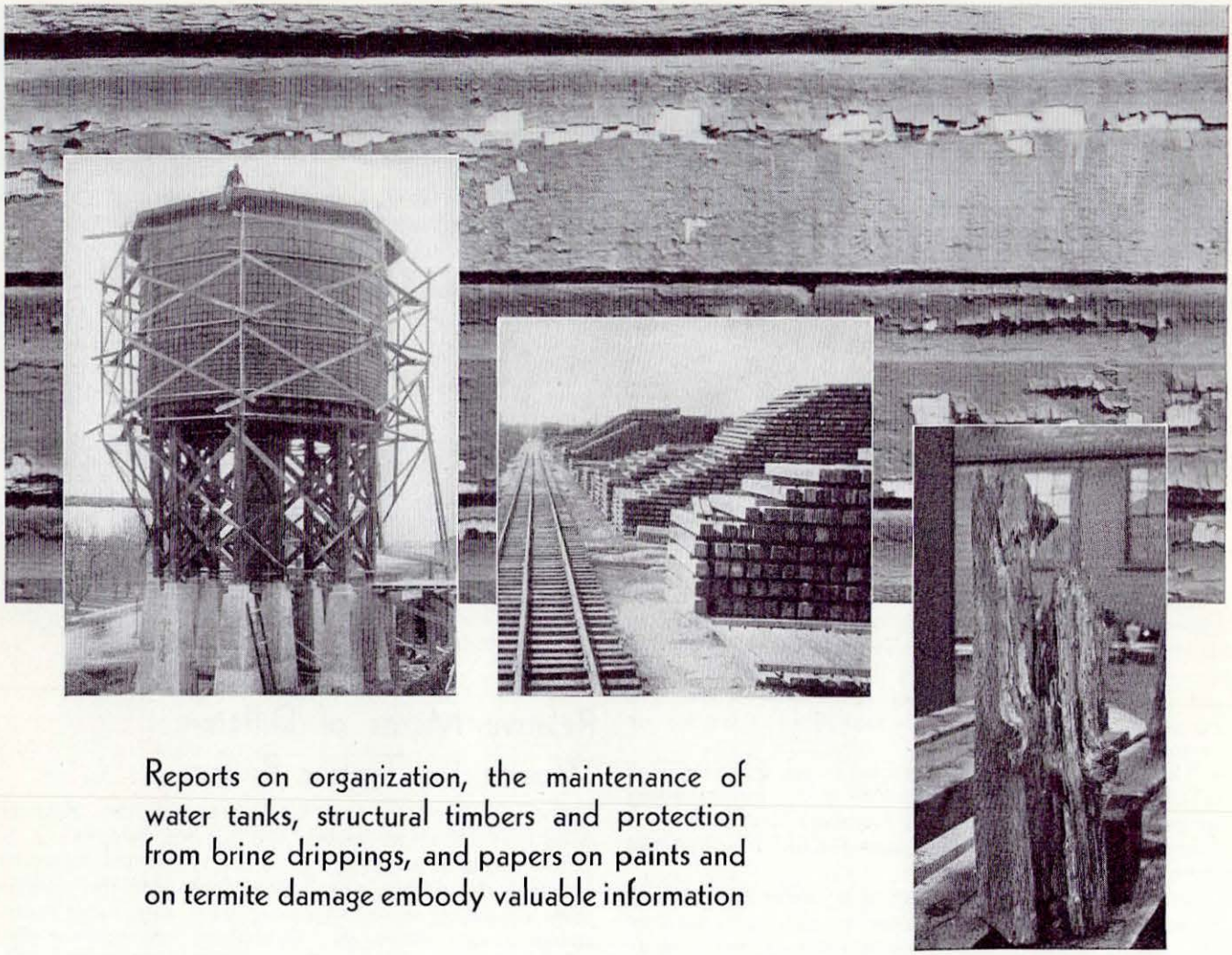
Districts	1936	1935	1934
Eastern	162,405	146,891	131,383
Allegheny	162,085	131,869	114,866
Pocahontas	58,411	52,638	44,370
Southern	112,617	97,655	88,653
Northwestern	123,557	106,732	84,498
Central Western	130,687	116,829	105,476
Southwestern	66,210	58,007	55,562
Total Western Districts	320,454	281,568	245,536
Total All Roads	815,972	710,621	624,808
Commodities			
Grain and Grain Products	33,025	33,932	32,164
Live Stock	22,273	20,931	25,543
Coal	154,615	132,096	119,753
Coke	10,334	6,955	4,943
Forest Products	36,327	30,696	21,923
Ore	49,766	32,636	14,655
Merchandise L. C. L.	170,819	165,914	161,704
Miscellaneous	338,813	287,461	244,123
October 24	815,972	710,621	624,808
October 17	826,155	732,304	640,727
October 10	820,195	734,154	636,999
October 3	819,126	705,974	632,406
September 26	807,070	629,935	646,084
Cumulative Total, 43 Weeks	29,460,040	25,995,137	25,897,392

Car Loading in Canada

Car loadings in Canada for the week ended October 24 totaled 59,966, as against 55,182 for the previous week and 52,800 for the forty-third week last year, according to the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
October 24, 1936	59,966	26,134
October 17, 1936	55,182	24,492
October 10, 1936	60,219	25,497
October 26, 1935	52,800	21,809
Cumulative Totals for Canada:		
October 24, 1936	2,024,667	993,045
October 26, 1935	1,942,768	913,331
October 27, 1934	1,916,095	926,003





Reports on organization, the maintenance of water tanks, structural timbers and protection from brine drippings, and papers on paints and on termite damage embody valuable information

Bridge and Building Men Convene at Chicago

Part II

A RUNNING report of the forty-third convention of the American Railway Bridge and Building Association, together with abstracts of four of the committee reports, was published in the *Railway Age* of October 31. Supplementing that article we present below abstracts of the four remaining committee reports and of papers presented by Harry R. Duncan and F. L. Browne. A paper by R. P. Hart, assistant bridge engineer of the Missouri Pacific, on Meeting Specific Problems in Bridge Design, will be published in abstract in a later issue.

The Inspection and Maintenance of Water Tanks

A report presented by committee chairman R. E. Dove, assistant engineer, C. M. St. P. & P., comprised a detailed discussion of the inspection and maintenance of water tanks. The committee pointed to the need for systematic annual, semi-annual and more frequent inspections, but stated that no definite rule can be followed rigidly since the need for inspections depends on the type of tank, its age and general condition. Obviously, there will be little necessity for the inspection of a new tank for two or three years after its construction, whereas one nearing the end of its life should be inspected at 60-day intervals, and sometimes more often. The committee then presented a detailed outline of the procedure for the complete inspection of wood and steel tanks, from the foundation to the finial, including suggestions concerning the form of record, the routine method and the equipment needed.

Suggestions were offered regarding the exercise of judgment in determining the need for repairs. Generally, according to the report, it is not important that the roof on a tank be watertight; it is maintained to

keep the tank as nearly frost-proof as possible and to keep out birds and foreign particles in the air. According to the committee, there does not appear to be any set practice about emptying the tank to permit inspecting the interior. Little decay of the staves occurs in the portion that is constantly submerged, but decay occurs at the upper portion where the water surface varies. For this reason, many inspections are made with the water partially drawn off from the tank to permit observation of the staves at the usual water line.

While avoiding any direct comparison of the merits of steel and wood tanks, the committee stated that wood always shows signs of unusual stress long before actual failure, whereas steel on the other hand often collapses without warning.

Turning to the subject of maintenance, the committee showed how the responsibility of maintaining water tanks is divided between the bridge or carpenter foreman and the water-service foreman. The bridge or carpenter foreman is responsible for the structural members, and the water service foreman for the operating parts used in taking water and controlling the water supply.

The maintenance of water tanks, according to the report, should be planned so that the work may be carried out with the least interference to operation. In many cases, there are parts of the year when the tanks are used less than at other times. It can also be arranged for repairs to be made when the tank is out of service for cleaning.

The report also directed attention to the importance of scheduling the repair work, both for the programming of the time of the gangs and to insure the delivery of material as needed. Several plans for ordering material were cited.

This portion of the report was followed with an account of the methods employed in making repairs on all parts of tanks, including comparisons of two or more methods of conducting the same operation. Particular attention was given to frost boxes, which, according to the committee, will not last half as long as the tanks. A well-constructed tank of redwood or cypress will last 40 to 50 years if well maintained, but a frost box will last only 10 to 15 years unless it is constructed of treated material.

One of the most important factors in the maintenance of water tanks, according to the report, is the water level. Tanks often suffer because they are not kept filled, particularly where they are used infrequently or irregularly, and where the pumping is controlled manually. A tank properly erected and kept full of water will require little maintenance.

The maintenance of steel towers is mainly a matter of keeping them clean and painted. Where column foundations are set low, it is important to see that the bottoms of the columns and bedplates are kept clean. The report also reviewed practice in regard to scaffolds, stating that spray painting simplifies the problem of scaffolding, as extension spray guns six to eight feet long can be used readily to enable the operator to apply the paint beyond ordinary reach.

Under the head of cleaning, the committee stated that the character of the water used determines the frequency with which roadside tanks should be cleaned. As a rule, it will not be necessary to clean flat-bottom tanks more frequently than once a year where the water is obtained from wells, city supplies, lime-soda treating plants equipped with filters, or from reservoirs. However, the tank should be emptied and examined annually, regardless of the amount of suspended matter present in the water. It is essential, therefore, to make arrangements that will insure that the tank will be cleaned in the shortest possible time.

In conclusion, the committee declared that the best of mechanical facilities will function in only a perfunctory manner, or fail entirely, unless their operation is followed up by a careful check system. Furthermore, it is essential for the safe and successful operation of water tanks, that a conscientious inspection be made and that a systematic maintenance program be carried out.

Discussion

Extensive discussion centered on the determination when a wooden water tank is near the end of its life, the consensus being that this stage is reached when leaks in the floor or staves cannot be stopped. Suggested methods of overcoming this leakage, with a view to carrying the tank for a longer time, included the application of concrete floors over the existing floor, the use of asphalt and fabric waterproofing, the application of clay on the interior of the tank and the filling of the cracks with partly-dried paint. Comments on the use of false floors emphasized that the boards of the false floor must be at right angles with those in the original floor and that the original floor must be well supported to avoid failure.

Relative Merits of Different Woods for Timber Bridges

As chairman of the Committee on the Relative Merits of Different Woods for Timber Bridges, G. S. Crites, division engineer, B. & O., presented a report in which the subject was broken down into the various parts of the structure, including piles, sills, caps, posts, stringers, ties, floors, etc., and taking into account also whether the application is temporary or permanent. The discussion under each of these various heads included a list of recommended species, based on the properties of the woods and the requirements of the particular service.

By way of explanation the report included the statement that usage and natural causes have determined the relative merits of different species of wood for timber bridges. Wood preservation has increased the number of species that may be used economically, but the depletion of our forests has narrowed the range. The properties required of timber for use in bridges are strength, durability and economy. Price and availability have limited the number of meritorious species to comparatively few.

The report as a whole was summarized by the committee as follows:

Other than for piling, availability and price have restricted the number of species that may be used economically for bridge work. Oak, beech, birch, dense pines, Douglas fir, larch and hemlock are more or less available for bridge ties. Dense Douglas fir is the species most largely available for structural timbers, although in some localities dense pines, larch, cypress, redwood or hemlock might be available and economical. The man in the field prefers treated dense pine or well-selected treated Douglas fir for structural timbers and treated oak for ties, where tie supports are not too far apart. However, select pine of suitable sizes for structural timbers, and good oak suitable for ties are becoming scarcer and more expensive, so that selected Douglas fir is being used more and more for timber bridges. The men in the field should use the denser timbers for caps, sills and blocking, when it is possible for them to make a selection. In all events, these men will have to make the best possible use of the timber that is available most economically.

Discussion

The discussion of this report developed divergent views on the merits of different species of wood, par-

ticularly Douglas fir, from which the conclusion was drawn that performance, in-so-far as strength was concerned, depended largely on the grade purchased and the extent to which the specification was enforced. According to Chairman Crites, checking of Douglas fir is proportional to the moisture content when delivered, and lumber shipped by water has a higher content than when shipped by rail.

Protecting Steel Bridges Against Brine Drippings

One of the most formidable problems confronting officers in charge of bridge maintenance is the protection of steel bridges from the corrosive action of brine drippings from refrigerator cars, which was the subject of a committee report presented by B. R. Meyers, assistant general bridge inspector, C. & N. W., and chairman of the committee. The committee reviewed in detail the efforts made to require the installation of brine retainers but dismissed this expedient as economically not feasible.

Information received from 35 railroads indicated that only 8 of them have found their protective measures effective, and it appears that these roads are not confronted with the problem in its most intensified form. The committee cited the concrete ballast floor as affording the best protection against brine drippings, but added that this advantage does not always warrant the additional expenditure required for this type of construction, as compared with the open-floor types.

Most of the roads reporting use heavy protective coatings, such as special paints, petrolatums, crude oils, asphalt or asphalt products, tar or tar products and bridge cements. No one of these materials was favored by a majority of the roads and many of them use several different types. There appears to be an increasing interest in the use of petrolatums and road oils. One road applies a heavy coating of gas-house tar over graphite paint and then sands the surface. This is reported to stand up very well for about four years.

The committee also described a process involving the application of a "rust inhibitor," followed by a primer consisting of a zinc chromate iron oxide pigment in a synthetic-resin base vehicle containing a phenol-formaldehyde varnish, the finishing coats being either graphite or aluminum with the same vehicle. However, this process is not applied until the uncoated steel has been allowed to weather long enough to permit the mill scale to be removed readily. Reference was made also to several other coatings, without any specific statements as to their effectiveness other than a general statement that all open accessible parts of the structure subject to brine can be protected if the protective coating is applied often enough. From the few records available, these applications are necessary at intervals varying from six months to four years, depending on the density of refrigerator-car traffic.

Commenting on the use of wrought iron protection plates, the report stated that this appears to work well in combating brine-corrosion and, if provisions are made for quick drainage, will protect the structural steel for many years. Reference was made also to the use of tapered "brine blocks" between the ties and to the covering of the top flanges of open deck bridges with burlap or canvas soaked in red lead.

Following a detailed description of the so-called "metallizing" process, in which corrosion-resisting metal is applied in liquid form, the committee presented data indicating a cost of 43 to 55 cents per sq. ft., compared with 17 cents for painting. Other expedients suggested were the use of copper-bearing steel and the use of excess thickness of cover plates, flange angles, etc., in parts of bridges subject to corrosion.

In closing, the committee pointed to developments in mechanical refrigeration and the substitution of dry ice as affording possible solutions of the problem, stating that we may look forward with optimism toward the increased use of these new types of cars which will reduce the amount of brine drippings.

Discussion

Several speakers reported favorable results from a commercial petrolatum preparation if applied at least ⅛ in. thick. One member said that he had installed wrought iron covers on beams and girders during the last three or four years and that thus far they were giving excellent service. Another member reported that he had metallized one bridge, but that the economy of this practice, which is expensive, will depend on how long the protection proves effective.

Organizing Bridge Work For the Period of Recovery

A report presented by a committee of which W. B. Mackenzie, assistant bridge engineer, St. L.-S. F., was chairman, reviewed current trends in the organization of gangs and in the procedure followed in handling bridge and building work. Particular emphasis was given to the need for a careful study of the new materials of construction being introduced, and attention was directed to the advantages of preframing timbers before treatment.

In reviewing the progress made in developing more efficiently organized gangs, the committee recommended the greater use of "company" forces for improvement projects, rather than awarding such work to contractors. Attention was directed also to the tendency toward specialization in the conduct of maintenance work on bridges and buildings and to the resultant increase in the demand for better trained employees. In this connection, the committee cited the recommendations of the Committee on Economics of Railway Labor of the American Railway Engineering Association, in its report to the convention in 1935, for the recruiting and training of men, and expressed the belief that much can be done by railroad supervisory forces through personal contact and personal interest to promote individual interest and efficiency.

Termites in Railway Structures

By H. R. Duncan*

A few years ago, a badly infested sill was removed from a railway building in Galesburg, Ill. The side of the sill which was exposed to the atmosphere was in almost perfect condition, but the other side, the top, and the bottom were very badly damaged. I asked the division officer responsible for the maintenance of this building what caused this particular stick of wood to deteriorate. He looked it over and told me that it was badly decayed. I then showed him live termites in the wood. Since that time, he has been very successful

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in detecting the presence of termites in various structures, for the maintenance of which he is responsible.

On our railroad we have reports of termite damage in depots, bridges, roundhouses, stockyards, pump houses, freight houses, water tanks, coal chutes, section houses, telephone booths, ice houses, tool houses and hose houses in Illinois, Iowa, Missouri, Kansas, Nebraska, Colorado and Wyoming.

Although we have heard more about termites as a menace to wooden structures during the last few years, there is ample evidence that they existed here long before men. When combating termites, it is important not only to remove the infested wood in the structure, but also to take some means of making the wood unattractive to the termites for food. The fact that termites do their best work under cover and in darkness contributes materially to the difficulty involved in locating them. They do a great deal of damage to structural members of a building without reducing the strength sufficiently to expose themselves or cause the structures to collapse in ordinary service, although some cases have been reported where a change in the loading has resulted in the collapse of an infested and damaged structure.

To determine the presence of termites, it is important that a complete investigation be made when any of the winged reproductive caste swarm or when run-ways or tubes are observed. These are two of the easiest ways of detecting their presence. It is important, in territory known to be infested with termites, that all buildings be thoroughly and frequently inspected. In some buildings, inspection is reported to be made every 60 days; in others, every 6 months. Personally I would favor a thorough and complete inspection about every 6 months. This inspection should involve examination of all wood in contact with the ground or masonry. To accomplish this, it is necessary to remove some of the earth or dig a trench along the foundation wall. Arrangements should be made to get under the structure and have sufficient light available. Usually artificial light is necessary where termites are working.

Damage to wooden structures by termites may be avoided if the building is properly constructed and intelligently maintained. On the other hand, a wooden building, constructed in defiance of good building practices, can deteriorate fairly rapidly and be a heavy expense to its owner.

In termite infested territory we should provide methods of keeping subterranean termites from passing to and from the ground where there is moisture and from burrowing into untreated woodwork of buildings, and it is recommended that—

(1) No untreated wood should be used in foundations, and basement or cellar walls should be concrete.

(2) Cement mortar should be used in masonry foundations.

(3) All masonry foundations should be capped with concrete or cement mortar and slate.

(4) Metal mechanical barriers should be placed over the foundation walls.

(5) Proper ventilation and screening of all ventilation openings and doors should be obtained.

(6) All wooden forms on foundations should be removed from masonry work within 15 days and grading stakes should be removed before the concrete is laid.

In connection with recommendation one, with reference to the use of treated wood, I have observed treated wood that has been in use for a considerable period of time and I have never found a piece of wood which was properly treated and properly used that was damaged by termites. Reports have come to me indirectly of treated wood in this country being destroyed by termites. I am inclined to believe this was probably due to the fact that some of the untreated wood was exposed rather than any standard preservative having failed.

The most serious problem is that of locating and stopping damage by termites in wooden structures that have been designed and constructed without giving consideration to these provisions for termite-proofing.

The idea back of the protective measures is that no untreated wood will be used in contact with the ground, adequate ventilation will be obtained, and all openings in walls, regardless of the material used in their construction, will be closed up so termites cannot gain entrance into the building. If any wood is in contact with the ground, it should be treated in an approved manner with standard chemical preservatives.

In recent years, a number of companies throughout the United States have gone into termite exterminating work. While undoubtedly some of them are entirely honest and sincere and well qualified to carry on this work, nevertheless apparently some of them do not come under this category and often exaggerate the damage that has occurred or will occur and have also exaggerated the effectiveness of their method. As a result, the owner of an infested property gets a distorted picture of what is likely to occur and becomes somewhat panic stricken in regard to this condition of his property.

We have had very few cases of termites in our bridges. In most cases, the wooden bridge material on our railroad is treated. It has also been my thought that there is sufficient food supply for termites so that it is not necessary for them to build tunnels from the ground on to a bridge, which vibrates so much that very likely the tunnels will be broken and will have to be replaced frequently.

Paint for Building and Structural Uses

By F. L. Browne*

Most painting takes the form of renewing a coating applied some years previously; the composition of the renewed coating and the behavior to be expected of it depend upon the composition and age of the paint or paints used previously as well as upon the composition of the new paint. To the paint purchaser, therefore, the important point is not whether a given paint is capable of good service, but whether it can be relied upon to give good service on the particular building for which it is purchased. A good paint for one building may be a bad paint for the one next door.

Haphazard programs of paint maintenance often lead sooner or later to disaster, even though high grade paints are always used, because one or more of three principal blunders are made: (1) Incompatible combinations of paints are used either in the same paint job or in successive paint jobs, (2) either too much or too little paint is applied at a time, (3) either too much or too little time is allowed to elapse between paintings.

Incompatible Combinations of Paints

For a long time much emphasis has been placed on the fact that paints last longer on some woods than on others, but very little has been said about the even greater variation in behavior when paint of any one kind is applied over paints of other kinds. We know certain

*Senior Chemist, U. S. Forest Products Laboratory, Madison, Wis.

combinations of paints that commonly lead to difficulties but we do not know yet just how far two paints may differ and still work reasonably well together.

A very common incompatibility results from the application of a white or tinted white paint over a colored paint made with little or no lead or zinc pigments. For example, during a 2,000 mile journey over a certain railroad a few years ago the cracking and slipping of a bright yellow paint over red iron oxide paint could be observed from the Pullman car at nearly every station. Early failures of white paints over greens, browns, and blacks are likewise to be seen frequently.

Incompatibilities likewise arise among white paints when they are made with very different combinations of white pigments. It has long been held that white lead and zinc oxide, unlike the remaining white and transparent pigments, are chemically active and profoundly modify the linoxyn formed from linseed oil. Variation in the zinc oxide content of paints causes very distinct changes in the physical properties of the paint. Until more is known about the compatibilities of paints prudence suggests repainting always with much the same kind of paint used previously.

The proportion of total pigment to non-volatile liquids in paint is significant from the point of view of compatibility. Some of the incompatibilities between newer and older types of paint may be due as much to differences in content of total pigments as to differences in proportions of white lead and zinc oxide between the old and the new paint.

Paints are now appearing on the market in which other drying oils have been substituted for linseed oil or in which resins have been incorporated. These developments raise a question about possible incompatibilities that may arise from differences in the nature of the vehicles in paints used successively. Those who wish to follow conservative programs of paint maintenance may well be cautious about using paints containing resins or drying oils bodied sufficiently to impart the qualities of enamel, until further experience clarifies the uncertainties about the maintenance programs for which such paints are suitable.

There seems to be an optimum range of thickness of paint coatings for optimum service. Thinner coatings of each type of paint, whether they hide the surface satisfactorily or not, are less durable and more liable to difficulty with spotted chalking and fading. On the other hand, thicker coatings, especially with the harder paints, not only prove no more durable but are prone to more conspicuous cracking, curling and flaking. In a good program of maintenance the amount of paint restored at each repainting does not greatly exceed the amount worn away since the previous painting so that the thickness of the coating can be kept within the region of optimum serviceableness.

Much trouble with paint comes from failure to observe any systematic plan of repainting. Except with paints that stand neglect well, repainting should anticipate rather than follow break-up of the coating. Where repainting is done before the coating cracks, curls, and flakes in patches there is no problem of scraping off all loosened paint and a smooth, sound foundation for the new layer of paint is assured. The economical course in the long run is to adopt a planned program of maintenance when the building is erected, select a type of paint suitable for the program, and then adhere firmly to the program.

The old custom of using red iron oxide paints for the maintenance of buildings of strictly utilitarian purpose still has much to commend it. Good paint of that type is exceedingly durable and stands neglect well. For those reasons colored pigment paints like iron oxide paints are particularly appropriate for maintenance programs with long intervals between paintings. Aluminum paint is beginning to find use as a complete coating for wood for programs with long intervals between paintings. From the point of view of maintaining protection for an unusually long time it is superior to iron oxide paints and its appearance, although metallic, is brighter and more cheerful than the dull red of iron oxide.

Pure white lead paint is the best known very soft paint. It disintegrates by deep chalking, fine checking, and fine crumbling and it wears away by erosion fairly rapidly, but in consistent maintenance programs it does not crack, curl, or flake. While not an outstandingly durable white paint it is one of the very few white paints that can safely be allowed to pass through periods of neglect and still leave a surface that can be repainted easily and with assurance of normal durability. For maintenance of railroad property, however, soft paints have the serious disadvantage of collecting dirt badly and being somewhat difficult to wash satisfactorily.

Modern Trends in Paint Formulation

In the writer's opinion the outstanding development in exterior paints in recent years is the increasing diversity in types of paint on the market and the consequent necessity for greater technical knowledge of paint composition and its significance in paint maintenance programs on the part of the paint user. In-as-much as it is rarely practicable to place the maintenance program completely in charge of a single paint manufacturer, the paint user must assume far more technical responsibility than he is often prepared to handle intelligently. After all, paint is only one of the many materials with which the maintenance engineer must deal. Some kind of generally recognized classification of paints by types with practical reference to the maintenance programs for which they are suitable is rapidly becoming essential if paint is to be restored to the ranks of reliable building materials.

I. C. C. Approves C. & D. in East

(*Continued from page 674*)

that question, the record does not warrant the conclusion that the rates are within minimum limits of reasonableness, having in mind our duties and responsibilities under the Interstate Commerce Act, as it has been amended. It is possible that respondents could show to the contrary by a full disclosure of all the pertinent facts in their possession, but there has been no such disclosure. Similar conclusions apply to the limited arrangement for pick-up and delivery service now in effect.

The fact is, also, that a rejection of these tariffs would be far from a misfortune for respondents, and I think that some of them realize this. The railroads ought to establish universal store-door pick-up and delivery service for less-than-carload freight, and they ought to reduce many of the applicable rates. But if they are to do these things and prosper, they must organize for the efficient and economical handling of such freight. It is now handled in a crude and very wasteful way. The traffic must be greatly concentrated and expedited and much of the present station expense eliminated. The railroads know how these faults can be corrected, but their divergent interests in forwarding companies and like considerations have prevented them from cooperating in a common endeavor to that end. Instead, these tariffs are proposed, which will add greatly to the expense of handling less-than-carload freight at the terminals without taking any effective steps to reduce the transportation expense. A great system like the Pennsylvania can do, and is doing, something in this direction, but no really effective correction of the present general and great waste is possible without a much greater degree of collective effort on the part of all the railroads. The proposed tariffs will, in fact, increase the difficulty of improving conditions in important respects.

Denver Zephyrs Hauled by 3,000-Hp. Diesel Locomotives

(*Continued from page 670*)

sion control, and all locomotive lights. These batteries each have a capacity of 450 amp. hr. at the ten-hour discharge rate.

Three Gardner-Denver mechanical air compressors comprise the air-pumping equipment for this locomotive. They are direct-connected through flexible couplings from the shaft extensions of the main power plants, each power plant driving one air compressor. The air compressors are of the two-stage, water-cooled type with intercoolers between the low- and high-pressure pistons. All compressors are equipped with an unloader valve controlled by a governor. The rated displacement of each compressor is 79.4 cu. ft. per minute at 750 r.p.m.

Two Vapor automatic oil-burning boilers comprise the heating equipment of the locomotive and are located in Unit B. Each has an evaporating capacity of 1,500 lb. of water at 200 lb. steam pressure. A feed-water tank of approximately 1,000 gal. capacity is provided. Both boilers receive their fuel from the main fuel tank.

Diesel-Engine Cooling, Lubrication, Etc.

The majority of wearing parts of the three Diesel engines, such as pistons, sleeves, valves, cylinder heads, etc., are interchangeable. Special attention has been given to the arrangement of all the power-plant equipment in order to provide maximum accessibility for either maintenance or inspection.

Each engine has its own cooling system, consisting of water-cooling radiators, water supply tank, circulating pump and air fans for radiator cooling. The radiators, which are of the fin-tube type, are hung in two sections parallel to the engine and supported from a removable hatch directly over the engine. The water-supply tank is located below the level of the radiators to permit draining of the radiators when the engine is not running. A water circulating pump is located on the engine at the rear of the blower gear case. On Unit A there are two 34-in. diameter air-circulating fans for each of the 900-hp. engines, these fans being driven off the camshaft through V-belts. On Unit B there are four 26-in. diameter air circulating fans driven through belts from a shaft extension of the main generator. The fans supercharge the engine compartment to approximately ½ in. of water pressure, which pressure is permitted to vent through the radiators to the atmosphere.

An exhaust muffler for each Diesel engine is located in a well in the hatch directly above the engine. The muffler is connected to the engine by individual pipes to each cylinder and exhausts to the air through stub riser pipes.

Each engine has its own complete lubricating-oil system which consists of an oil tank, oil cooler, oil filter and pump. The oil supply reservoir is a copper tank having a capacity of 60 gal. with a large opening at the top for easy filling. The oil cooler (two of these units are used with the 1,200-hp. engine) is a newly designed, compact, water-cooled unit which has ample capacity to maintain the oil at the proper temperature. Large size oil filters are installed ahead of the cooler. The pump is driven by the main engine.

The lubricating-oil system includes the use of two dry sumps, one at each end of the crank pan, fitted with removable strainers. A dual scavenging pump draws the hot oil from these sumps and passes it through the filter and oil cooler to the oil supply reservoir. Cool, filtered oil is taken from the supply tank by the pressure pump and distributed throughout the engine at the required pressure as regulated by a pressure relief valve, which discharges into the crankcase. A device is provided to close the engine throttle in the event of a deficient oil supply.

The locomotive has a capacity to carry 1,780 gal. of fuel in two tanks, 800 gal. being carried under Unit A and 980 gal. under Unit B. These fuel tanks are equipped with gages and are arranged to be filled from either side of the locomotive. Both tanks are properly vented in accordance with I.C.C. requirements. Fuel is supplied to each engine by means of an electrically-driven fuel pump.

Odds and Ends . . .

Pipes

H. C. Emerson, chief clerk to the auditor of passenger and station accounts for the Illinois Central, claims the largest collection of pipes of any railroader. He has over 300 of them, collected from all over the world.

Mercury Medals

To commemorate the building of its modern train "The Mercury," the New York Central struck off 500 copies of a medal showing the date and nameplate of the train. These were distributed to each of the mechanics, draftsmen and designers who took part in building the train.

Friendly Act

When train service was tied up because of a tunnel fire on a Louisville & Nashville subdivision recently, Engineman John Neill and his wife came to the rescue nobly. Using their own and a borrowed automobile, they transferred several passengers to the main line, and, on the return trip, delivered several packages of newspapers that are regularly handled by baggage car.

Britain's First Railway Saleswoman

The first saleswoman to act for a British railway has been appointed by the Great Western—Miss Audry Shirtliff of Chelsea. Chiefly, her duties will be to keep in touch with all kinds of women's organizations; to contact factories where women are employed in order to assist in the promotion of outings and excursions of every description, and to give advice in regard to itineraries, sightseeing, amusements, catering, etc.

Attention, Wives!

Mrs. James L. Berry, wife of a veteran Central Vermont conductor, J. L. Berry, has established a record which her husband thinks has never before been equalled or bettered. With no interruptions except on the occasion of the birth of their six sons, Mrs. Berry has risen at four o'clock every morning for the last 38 years to get her husband's breakfast, and what's more, she has joined him in eating these early morning meals which have been described by friends as a "sort of communion in the intimacy of dim hours when most of the world is sleeping."

High School Trains

This year the students of the Helena, Mont., high school have to board the train again on the long journey toward knowledge. Eighteen coaches lent by the Great Northern and Northern Pacific have been used since the earthquake wrecked the high school building last October. Boardwalks connect each coach and lead up into them from the ground. All of the coaches are heated from a central plant. In most of the coaches, the students sit on the plush seats, but in the science department, the seats have been removed to make room for working tables.

NEWS

Continuance of Reduced Citrus Rates Authorized

I.C.C. extends fourth section relief on shipments from Florida to northeastern markets

The Interstate Commerce Commission has authorized the continuance until July 31, 1937, of the fourth section relief previously granted for a period expiring on July 31, 1936, authorizing the railroads to establish reduced rates on citrus fruits from Florida to New York, Philadelphia, Baltimore, Boston, and other points in New England to meet water and truck competition, effective of traffic delivered to initial carriers on four "shipping days" only of each week. Certain modifications were also authorized proposed by the railroads to reflect the prevailing truck charges where the present rates were based on erroneous information or on truck charges which have been changed. As indicating the success of the rate reduction from the railroad standpoint the report says that of the total of 24,883 carloads of citrus fruits shipped from Florida to the north Atlantic ports during the 1934-35 season, when the all-rail rates exceeded the charges of the truck-and-water routes, 3,519 carloads or 14.1 per cent moved by the all-rail routes and 21,364 carloads or 85.9 per cent, by the truck-and-water routes. The proportions handled by the all-rail routes were approximately 9 per cent to Boston and New York, 19 per cent to Philadelphia, and 56 per cent to Baltimore.

Of 24,776 carloads shipped during the 1935-36 season, 5,199 carloads moved prior to the effective date of the present rates and 19,577 carloads, on and after that date; of those respective numbers, 338 and 6,205 carloads, or 6.5 and 31.7 per cent, moved over applicants' routes, and 4,861 and 13,372 carloads, or 93.5 and 68.3 per cent, over the truck-and-water routes; and, of the total movement since establishment of the present rates, the proportions handled by the all-rail routes were 38 per cent to Boston, 21.3 per cent to New York, 45.5 per cent to Philadelphia, and 79.9 per cent to Baltimore. The carloads handled to Baltimore by the all-rail routes numbered 131 during the period December 12-31, 1935, and 196 in January, 200 in February, 237 in March, 130 in April, and 93 in May, 1936, as compared with 12, 38, 20, 30, 100 and 48 handled by the truck-and-water routes during those respective periods. To that point, the proportions of the total traffic handled by the all-rail routes were 88.4 per cent for the period December 12, 1935, to and including March, 1936, and 60.1 per cent thereafter, following a reduction in the water rates which became effective March 23, 1936.

Trainload Rate on Oil Suspended

On protests by certain oil companies the Interstate Commerce Commission has suspended until May 31, 1937, tariff schedules proposing to establish a reduced export and coastwise rate of 7 cents per hundred pounds on crude petroleum oil, in tank cars, from certain Kancas City Southern stations in Louisiana, and Ravanna, Ark., to Good Hope, La., and other Louisiana ports, applicable only on movements tendered in trainload lots of 50 cars or more, to meet pipe-line competition.

Mechanical Exhibit Next June

The general committee of the Mechanical Division, A.A.R., and the general committee of the Purchases and Stores Division, at a meeting in New York on Thursday, decided to hold their annual convention in Atlantic City, N. J., next June. The Railway Supply Manufacturers Association will co-operate by having an exhibit. It is seven years since a joint convention and exhibit of this sort has been held.

The Canadian Roads in September

The Canadian Pacific reports net operating revenues for September at $3,422,884, as compared with $3,290,218 for September of last year, an increase of $132,666. Gross for the month at $14,312,164 showed an increase of $866,510, while operating expenses at $10,889,280 showed an increase of $733,844.

For the first nine months, net operating revenues at $11,827,468 showed an increase of $440,710.

In September the Canadian National had operating revenues of $17,956,964, an increase of $2,057,285 over the corresponding month of 1935. Operating expenses were $14,994,327, an increase of $1,385,878. Net revenues for the month amounted to $2,962,637, exceeding that of 1935 by $671,407.

For the current year up to the end of September, operating revenues have amounted to $134,448,312, an increase of $9,349,237. Operating expenses totaled $128,242,851, showing an increase of $9,278,336 over 1935. Net revenue totals $6,205,461, an increase of $70,901 as compared with the nine months of last year.

Canada Will Regulate All Transport Agencies

Transport minister plans expanding job of Railway Board—Hopeful for C. N. R.

In an address before the Canadian Club at Montreal on November 2, Hon. C. D. Howe, Minister of Transport, outlined the scope of the new Cabinet post which he holds—embracing railways, canals, marine, airways, harbors and radio broadcasting. He stated further that regulation of other forms of transportation would be undertaken by the Dominion and that he was hopeful of ending C. N. R. deficits.

"In viewing this transportation field as a whole," he said, "I have been impressed by the degree to which the railways have been regulated compared with the complete absence of regulation of competing forms of transport. It is the intention to remedy this situation by converting the present Railway Commission into a Transportation Commission which will be the rate-making and regulating body for all agencies of transport coming under the jurisdiction of the Dominion government, including rate-making for the Harbor Commissions. While this departure will not work miracles, it should help to provide for fair competition in transport.

"There is a good deal of misunderstanding about the position of the Canadian National. Last year that railway cost Canada $47,500,000; this being the government's contribution of cash required to meet all obligations of the railway for that year. The amount is a very large one, and quite serious enough to the taxpayers of Canada. Unfortunately, the books of the railway are kept in such a way that other charges are added which brought the bookkeeping loss up to $115,000,000, but I would like to make it clear that the actual cash loss was $47,500,000, and that the larger amount is a bookkeeping fallacy, based on a distorted capital structure which I hope to be in a position to deal with at the session of Parliament.

"I have every hope that before my term of office expires that the deficit on the Canadian National can be extinguished. This may sound optimistic, but nevertheless I believe that it is based on sound logic. I believe the business of the company is definitely on the upgrade. We have had poor crops in the west, and the movement of wheat is an important factor in our railway mileage; but I have sufficient faith in Western Canada to believe that this is only a temporary condition and that very shortly we will have abundant crops such as we had years ago."

Nine Months Railway Net a Return of 2.3 Per Cent

$434,864,004 an increase of 35.4 per cent over last year; September net up 22.3 per cent

Class I railroads in the first nine months of 1936 had a net railway operating income of $434,864,004, which was at the annual rate of return of 2.3 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics of the Association of American Railroads. This was an increase of 35.4 per cent compared with the first nine months of 1935, when their net railway operating income was $321,201,769 or 1.7 per cent. In the first nine months of 1930, net railway operating income was $648,115,287 or 3.44 per cent.

Operating revenues for the first nine months of 1936 totaled $2,930,464,310, compared with $2,511,779,127 for the same period in 1935, and $4,035,083,343 for the same period in 1930, an increase of 16.7 percent in 1936 over 1935, but 27.4 per cent below 1930. Operating expenses for nine months amounted to $2,164,601,812, compared with $1,917,393,205 for the same period in 1935, and $3,018,212,919 for the same period in 1930. Operating expenses for nine months were 12.9 per cent greater than in the same period of 1935, but 28.3 per cent below 1930.

Class I railroads in the first nine months of 1936 paid $231,403,928 in taxes compared with $182,517,653 in the same period in 1935, and $271,435,608 in the same period in 1930. For September the tax bill amounted to $26,861,239, an increase of $6,055,537 or 29.1 per cent over September, 1935. Nineteen Class I railroads failed to earn expenses and taxes in the first nine months of 1936, of which eight were in the eastern district, three in the southern district and eight in the western district.

Class I railroads for September had a net railway operating income of $70,166,026, which, for that month, was at the annual rate of return of 2.32 per cent. In September, 1935, their net was $57,349,265 or 1.9 per cent, and in September, 1930, it was $102,852,390 or 3.39 per cent. Operating revenues for September amounted to $357,206,662 compared with $306,946,095 in September, 1935, and $462,209,448 in September, 1930. Operating expenses in September totaled $248,553,260 compared with $218,071,436 in the same month in 1935, and $316,494,334 in September 1930. The increase in revenues over September, 1935, was 16.4 per cent. Passenger revenues increased 7.9 per cent.

Class I railroads in the eastern district for nine months had a net of $265,417,011, at the rate of 2.91 per cent. For the same period in 1935, their net was $211,359,675, or 2.32 per cent. Operating revenues in the eastern district for nine months totaled $1,482,256,928, an increase of 15.7 per cent, compared with 1935. Operating expenses totaled $1,052,578,099, an increase of 12.7 per cent above the same period in 1935. Passenger revenues showed an increase of 16.1 per cent over those of September, 1935. Class I railroads in the eastern district for September had a net railway operating income of $36,820,146 compared with $29,024,847 in September, 1935, and $43,450,804 in September, 1930.

Class I railroads in the southern district for nine months had a net of $52,904,206, at the rate of 2.27 per cent. For the same period in 1935 their net amounted to $35,649,815, at the rate of 1.52 per cent. Operating revenues in the southern district for nine months amounted to $362,159,947, an increase of 15 per cent compared with the same period of 1935. Operating expenses totaled $273,505,102, an increase of 9.4 per cent. Class I railroads in the southern district for September had a net of $7,809,684, compared with $5,978,785 in September, 1935, and $8,827,059 in September, 1930.

Class I railroads in the western district for nine months had a net of $116,542,787, at the rate of 1.57 per cent. For the same nine months in 1935, the railroads in that district had a net of $74,192,279, at the rate of 0.99 per cent. Operating revenues in the western district for first nine months amounted to $1,086,047,435, an increase of 18.6 per cent over the same period in 1935. Expenses totaled $838,518,611, an increase of 14.3 per cent. For September the railroads in the western district reported a net of $25,536,196, compared with $22,345,633 for the same roads in September, 1935.

CLASS I RAILROADS—UNITED STATES

Month of September

	1936	1935	1930
Total operating revenues	$357,206,662	$306,946,095	$462,209,448
Total operating expenses	248,553,260	218,071,436	316,494,334
Taxes	26,861,239	20,805,702	31,194,565
Net railway operating income	70,166,026	57,349,265	102,852,390
Operating ratio—per cent	69.58	71.05	68.47
Rate of return on property investment—per cent	2.32	1.90	3.39
Nine Months Ended September 30			
Total operating revenues	$2,930,464,310	$2,511,779,127	$4,035,083,343
Total operating expenses	2,164,601,812	1,917,393,205	3,018,212,919
Taxes	231,403,928	182,517,653	271,435,608
Net railway operating income	434,864,004	321,201,769	648,115,287
Operating ratio—per cent	73.87	76.34	74.80
Rate of return on property investment	2.30	1.70	3.44

Proposed Reports on Motor Carrier Certificates Made Final by I. C. C.

The Interstate Commerce Commission, Division 5, on November 4 made public orders declaring effective the orders recommended by examiners or joint boards on applications for certificates or permits under the motor carrier act in proposed reports which were made effective because no exceptions were filed within 20 days. Several such orders had been issued previously.

Railroads Handling Large Volume of Football Traffic

Fans attending recent games in the Middle West helped increase passenger revenues

Football fans attending games at Chicago, Evanston, Ill., Ann Arbor, Mich., Madison, Wis., and South Bend, Ind., on October 30 and 31 and November 1, not only created additional revenue for the railroads, but came in such crowds as to necessitate numerous unusual movements. The most outstanding in this respect was a special party organized by St. Mary's alumni at San Francisco, Cal., who chartered a special train of 14 cars for a circle tour of two weeks. The special train, carrying 239 passengers, including the team, left San Francisco on October 18. It was moved over the Atchison, Topeka & Santa Fe to Chicago and over the Pennsylvania from Chicago to New York, where it arrived on October 22 for the game between St. Mary's College and Fordham University. On October 26 the team went to Boston over the New York, New Haven & Hartford and thence to South Chicago, Ind., over the Boston & Albany and the New York Central, where it arrived on October 27. The special train carrying the spectators left New York on October 26 for Boston over the New York, New Haven & Hartford and the Boston & Maine and on October 27, went to Montreal over the Canadian National; thence to Quebec over the Canadian National; back to Montreal and then West, reaching Niagara Falls over the New York Central on October 29, and Chicago over the New York Central on October 30.

On that day the fans attended a game between St. Mary's and Marquette University in Soldiers' Field, Chicago, and on the following day were carried in their special train from Chicago over the New York Central to South Bend, to attend the Ohio State-Notre Dame game. From South Bend the train was moved over the Michigan Central to Joliet, Ill., where it was turned back to the Santa Fe for the return trip to San Francisco, where it arrived on November 3. The cost of the tour was $270 for one person in a lower berth.

Another unusual movement was one from Denver, Colo., to South Bend, Ind. For this trip the Notre Dame Club of Denver chartered the Advance Zephyrs and one of the new Zephyrs of the Chicago, Burlington & Quincy, to carry 230 persons to the Ohio State-Notre Dame game.

The heaviest movement over the week-end was that on October 30, when football fans were carried to Chicago. On this day more than 10,000 persons were carried from the Twin Cities by the Chicago, Milwaukee, St. Paul & Pacific, the Chicago & North Western and the Chicago, Burlington & Quincy to Chicago for the Northwestern-Minnesota game at Evanston, while at the same time several thousand fans were carried from Milwaukee and other nearby cities to Chicago for the St. Mary's-Marquette game on Friday night. The Milwaukee carried 5,087 pas-

sengers on five sections of the Hiawatha, and three sections of the Pioneer Limited, and 2,312 persons from Milwaukee to Chicago on three special trains. In addition it ran one special train from Milwaukee, to Madison. The five sections of the Hiawatha were operated on a 6½ hr. schedule from St. Paul, the sections running at 10 min. intervals. Of the five sections, only one was delayed, a loss of 20 min. being caused by a freight train. The locomotives used included two of the Hiawatha type, one converted from coal to oil, and two coal-burning locomotives. In order to eliminate delay, special arrangements were made for taking coal and water. At La Crosse, a clam shell bucket delivered coal from a car on an adjacent track to the tender, while water was being taken. The oil-burning locomotives took water at New Lisbon and Milwaukee.

Those attending the Northwestern-Minnesota game at Evanston traveled on coupon tickets covering transportation from the Twin Cities to Chicago over the Milwaukee and from Chicago to Evanston over the Chicago, North Shore & Milwaukee.

The Chicago & North Western carried 2,500 persons on five sections of the "400," four special trains and 25 extra sleeping cars from the Twin Cities to Chicago on October 30, and on the following day carried 5,000 fans on eight special trains between 12:45 p.m. and 1:30 p.m. from its Madison terminal at Chicago to Evanston, Ill. On November 1 it operated a special train, for the Colonial Wonder Ball to carry fans from Green Bay, Wis., to Chicago for the Packer-Bear football game.

The Chicago, Burlington & Quincy carried 1,000 persons from the Twin Cities to Chicago on October 30 on two sections of both the morning and afternoon Zephyrs and on extra cars of the Blackhawk Limited.

The New York Central on October 30 and 31 carried 9,299 passengers on seven trains out of Chicago, five out of Columbus, Ohio, and 11 out of Cleveland, Ohio, Toledo, Detroit, Mich., Cincinnati, Ohio, Indianapolis, Ind., and St. Louis, Mo., for the Ohio State-Notre Dame game at South Bend.

The Pennsylvania carried 1,109 persons on four trains from Chicago, Cincinnati, Ohio, Indianapolis, Ind., and Dayton, Ohio, to South Bend on the same day.

I.C.C. Practitioners Meet

The seventh annual meeting of the Association of Practitioners before the Interstate Commerce Commission was held at Washington on October 29 and 30. Elmer A. Smith, general attorney of the Illinois Central, president of the association, presided, and an address of welcome was given by Commissioner B. H. Meyer. I. L. Scharfman, professor of economics at the University of Michigan, addressed the meeting on "The Significance of the Interstate Commerce Commission as an Agency of Economic Control", asserting that the commission had achieved a high degree of effectiveness in its own sphere and has contributed substantially to the development of the essentials of sound regulatory process. Reports showed that the membership of the association has been increased to 1,613, including 323 names added to its rolls during the year. Allen P. Matthew, of San Francisco, Calif., was elected president of the association for the coming year.

Railroad Association Creates Patent Division

The board of directors of the Association of American Railroads at a meeting in Washington on October 30 approved the creation of a patent division in its law department under the direction of the general counsel, consolidating the functions of the Eastern Railroad Association, that has maintained an office at Washington, D. C., and the Western Railroad Association, of Chicago. An advisory committee is to be created with three representatives of the eastern roads, three of the western roads, and two of the southern roads.

N. & W. Magazine Publishes Memorial to A. C. Needles

The Norfolk & Western Magazine has issued a special supplement to its November issue in memory of Arthur Chase Needles, late president of that road, who died on October 25. This supplement of ten pages, carries as its frontispiece a portrait of Mr. Needles and includes an article in appreciation of the late Norfolk & Western executive and another on the development of the road under his leadership. Also, there are reproductions of a few of the telegraphic and editorial tributes received on the day following Mr. Needles' death.

The "Clevelander" Wrecked at Princeton, N. J.

On Thursday evening, October 29, about 9:15, near Princeton, N. J., westbound passenger train No. 39, of the Pennsylvania, known as the "Clevelander," was derailed while traveling at high speed and one passenger was killed; 20 or more passengers injured. This was the second derailment on the New York division of the Pennsylvania within one week, the first having been the wreck of parts of two freight trains at Menlo Park.

In the Princeton case the locomotive and three baggage cars ran a long distance before stopping. Ten pasesnger cars were derailed and three of them badly damaged, and the supports of the electric propulsion system were damaged. One track was cleared in about three hours.

The only information as to cause is that possibly it was a broken wheel, but the railroad management makes no statement.

Passenger Officers to Meet at New Orleans

The seventy-eighth annual meeting of the American Association of Passenger Traffic Officers will be held at the Hotel Roosevelt, New Orleans, La., on November 12 and 13. The program provides for a discussion of developments and improvements in train service and equipment, with emphasis on the beneficial results of lighter cars and new design. The 400, the Zephyr, the Hiawatha, the Flying Yankee, the Green Diamond, the Abraham Lincoln, the Mercury, the Super-Chief, the City of Los Angeles, the City of San Francisco and the City of Portland will be included in the discussion. In considering the development of passenger traffic, emphasis will be placed on salesmanship and new methods of solicitation; the caring for hand baggage which in the last few years has increased to a point where it is occasionally burdensome; all-expense tours, and smoking in air-conditioned coaches.

Club Meetings

The Western Railway Club will hold its next meeting at the Sherman Hotel, Chicago, on Monday evening, November 16. R. M. Ostermann, Superheater Company, will speak on the importance of feedwater heating in locomotive operation. Papers are expected also from representatives of other manufacturers.

The Central Railway Club of Buffalo (N. Y.) will hold its next meeting at Hotel Statler, Buffalo, on Thursday evening, November 12. J. V. Neubert, chief engineer, M.W., New York Central, will speak on modern problems in maintenance, and Burt T. Anderson, on meeting today's demands for modern signaling.

Southern Roads Oppose Class Rate Investigation

The southern roads have filed with the Interstate Commerce Commission an answer to the petitions recently filed by a number of state commissions, chambers of commerce, and other organizations asking the commission to institute an investigation of the southern class rate structure. They say that the present class rates in the Southeast are the result of the commission's previous investigation, that the petitioners have not set forth any change in conditions to warrant a new investigation, and that it could result only in the expenditure of a large sum of money to defend a rate structure which the commission has repeatedly held to be just and reasonable.

Committee Chairmen for New York Railroad Club Dinner

The New York Railroad Club this week announced the names of members of the committees which will be in charge of its 64th annual dinner to be held on Thursday evening, December 10, at the Commodore Hotel in New York.

Herbert W. Wolff, general chairman of the general committee in charge of the affair, will be assisted by two vice-general chairmen—Charles C. Hubbell and John A. Dillon. Other committees and their respective chairmen are: Advisory—David W. Pye; Dinner—Arthur N. Dugan; Reception—Frank Hedley; Seating—Thomas P. O'Brian; Attendance—Charles H. Carroll; Entertainment—Samuel MacClurkan; Publicity — Roy V. Wright.

Katy Adds New Trains

The Missouri-Kansas-Texas, on November 1, added two new trains and made other improvements in its passenger serv-

ice. One train, put on between Denison, Okla., and Muskogee, supplements the existing service and thereby relieves congestion on the Katy Flyer, which heretofore has made all local stops south of Muskogee. With this arrangement 20 stops will be eliminated from the schedule of the Flyer in the 160 miles, the remaining stops being McAlester, Atoka and Durant.

Train No. 23, the Katy Limited, has been discontinued between Fort Worth, Tex., and Houston and has been replaced by a new train, No. 11, which leaves Fort Worth at 9:40 a.m., and connects with Train No. 1, the Texas Special, at Waco, Tex. This train runs through to Houston, where it arrives at 6:45 p.m., thereby giving Fort Worth and points south more convenient service, and cutting several hours from the previous running time to Houston. By reason of the conection at Waco, faster service is also provided between Fort Worth and San Antonio. In addition, the Katy Limited has been speeded up to reach San Antonio at 9 p.m. instead of 9:30 p.m. Northbound this train leaves San Antonio at 1 p.m. and arrives in Dallas at 10 p.m., 15 min. earlier. It leaves Houston at 11:30 a.m. and arrives in Fort Worth at 9:45 p.m., 20 min. earlier.

Fourth Section Found Applicable to Rates to Mexico

Upon reargument in a case involving commodity rates from New York piers to Guaymas and Empalme, Mexico, the Interstate Commerce Commission has issued a finding that the long-and-short-haul provision of Section 4 of the interstate commerce act applies in connection with joint rates when the higher-rated intermediate point is in the United States; that such rates are comparable with those to intermediate points in the United States under Section 4; and that it is proper to consider the division accruing to United States carriers in the determination of the reasonably compensatory character of the rates. In the former report the commission held that the long-and-short-haul provision was applicable but denied fourth section relief. The proceeding has now been reopened for further hearing.

Railroads Urge Long-And-Short-Haul Clause Repeal

The Association of American Railroads has issued a pamphlet addressed to farmers pointing out their interest in the repeal of the long-and-short-haul clause of Section 4 of the interstate commerce act which will be sought by the railroads at the coming session of Congress. The Pettengill bill, for the purpose, was passed by the House at the last session but was not considered by the Senate, although hearings were held before the committee on interstate commerce. "Congress will be asked to repeal this clause", the association says, "so that the railroads may have greater freedom to meet competition, where it exists, by means of reducing certain rates so that a larger share of the general traffic may be secured. Under the present transportation law as it is administered", it points out, "the railroads cannot dispose of their surplus transportation unless they make such reduction in rates at intermediate points as would cause them to lose more than they could possibly gain from the additional volume of business secured."

Fourth Section Relief Granted for Differential Routes

The Interstate Commerce Commission has issued a supplemental report on differential routes to central territory modifying the relief from the long-and-short-haul provision of the interstate commerce act granted in a prior report to authorize, subject to conditions, (a) the differential all-rail routes to meet, during the period of lake navigation, the standard lake-rail rates from New York, N. Y., to Chicago, Ill., and Milwaukee, Wis.; (b) certain additional westbound ocean-rail, differential lake-rail, and differential all-rail routes from existing origin groups; and (c) certain additional origin groups in westbound ocean-rail rates. Relief temporarily authorized by a previous order over differential all-rail routes from New York to central territory was extended to certain additional routes.

Net Income of $16,384,500 Reported for Eight Months

Class I railroads for the month of August have reported to the Interstate Commerce Commission a net income of $20,857,329 after deduction of interest and other fixed charges. This compares with a net deficit of $2,304,998 reported for August of last year and was sufficient to offset dificits in earlier months of this year so that the roads had a net income

SELECTED INCOME AND BALANCE-SHEET ITEMS OF CLASS I STEAM RAILWAYS

Compiled from 138 reports (Form IBS) representing 144 steam railways
TOTALS FOR THE UNITED STATES (ALL REGIONS)

For the month of August 1936	For the month of August 1935	*Income Items*	For the three months of 1936	For the three months of 1935
$64,680,716	$42,156,709	1. Net railway operating income	$364,697,978	$263,852,509
11,238,162	11,154,287	2. Other income	95,303,307	101,916,309
75,918,878	53,310,996	3. Total income	460,001,285	365,768,818
1,490,706	1,309,088	4. Miscellaneous deductions from income	12,657,390	11,571,967
74,428,172	52,001,908	5. Income available for fixed charges	447,343,895	354,196,851
		6. Fixed charges:		
11,171,248	11,374,679	6-01. Rent for leased roads	89,431,887	89,113,653
41,152,712	41,715,428	6-02. Interest deductions	331,700,514	335,140,726
247,051	216,967	6-03. Other deductions	1,795,640	1,741,374
52,571,011	53,307,074	6-04. Total fixed charges	422,928,041	425,995,753
21,857,161	* 1,305,166	7. Income after fixed charges	24,415,854	* 71,798,902
999,832	999,832	8. Contingent charges	8,031,354	8,016,354
20,857,329	* 2,304,998	9. Net income †	16,384,500	* 79,815,256
16,126,094	16,126,396	10. Depreciation (Way and structures, and Equipment)	129,051,700	130,049,909
2,984,438	1,516,284	11. Federal income taxes	17,300,498	10,909,109
		12. Dividend appropriations:		
11,830,687	13,037,536	12-01. On common stock	52,366,611	62,036,204
3,036,072	2,505,336	12-02. On preferred stock	17,229,044	11,561,399

Selected Asset Items

		Balance at end of August 1936	Balance at end of August 1935
13.	Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	$688,772,332	$736,423,537
14.	Cash	$443,099,954	$372,425,177
15.	Demand loans and deposits	11,430,155	14,673,088
16.	Time drafts and deposits	33,126,411	30,104,981
17.	Special deposits	169,189,941	52,286,570
18.	Loans and bills receivable	1,987,793	4,077,589
19.	Traffic and car-service balances receivable	59,482,484	50,576,146
20.	Net balance receivable from agents and conductors	52,019,844	43,935,781
21.	Miscellaneous accounts receivable	140,406,598	132,471,252
22.	Materials and supplies	295,642,550	293,166,112
23.	Interest and dividends receivable	27,407,015	33,501,752
24.	Rents receivable	2,394,638	2,561,207
25.	Other current assets	6,372,099	4,265,258
26.	Total current assets (items 14 to 25)	$1,242,559,482	$1,034,044,913

Selected Liability Items

27.	Funded debt maturing within 6 months‡	$192,958,479	$185,922,020
28.	Loans and bills payable§	$220,025,568	$343,799,984
29.	Traffic and car-service balances payable	78,624,133	67,075,502
30.	Audited accounts and wages payable	218,326,219	205,555,010
31.	Miscellaneous accounts payable	97,291,597	53,659,096
32.	Interest matured unpaid	495,555,143	371,066,634
33.	Dividends matured unpaid	6,971,091	9,485,343
34.	Funded debt matured unpaid	448,158,928	314,704,643
35.	Unmatured dividends declared	14,497,949	14,483,078
36.	Unmatured interest accrued	107,874,803	108,622,509
37.	Unmatured rents accrued	33,342,095	33,126,416
38.	Other current liabilities	23,313,461	17,448,020
39.	Total current liabilities (items 28 to 38)	$1,743,980,987	$1,539,026,235
40.	Tax liability (Account 771):		
	40-01. U. S. Government taxes	$72,560,145	$33,740,236
	40-02. Other than U. S. Government taxes	157,577,570	157,051,884

† The net income as reported includes charges of $1,521,056 for August, 1936, and $11,653,878 for the eight months of 1936 on account of accruals for excise taxes levied under the Social Security Act of 1935; also $3,819,938 for August, 1936, and $23,441,433 for the eight months of 1936 under the requirements of an Act approved August 29, 1935, levying an excise tax upon carriers and an income tax upon their employees, and for other purposes. (Public No. 400, 74th Congress.) The net income for August, 1935, includes credits of $499,825 and for the eight months of 1935 credits of $6,965,070, on account of reversal of charges previously made for liability under the Railroad Retirement Act of 1934.

‡ Includes payments which will become due on account of principal of long-term debt (other than that in Account 764, Funded debt matured unpaid) within six months after close of month of report.

§ Includes obligations which mature not more than 2 years after date of issue.

* Deficit or other reverse items.

NET INCOME OF LARGE STEAM RAILWAYS WITH ANNUAL OPERATING REVENUES ABOVE $25,000,000

Name of railway	Net income after deprec. For the eight months of 1936	1935	Net income before deprec. For the eight months of 1936	1935
Alton R. R.	*$1,066,382	*$1,885,973	* $836,892	*$1,674,139
Atchison, Topeka & Santa Fe Ry. System§	3,174,299	3,467,331	10,738,967	11,154,070
Atlantic Coast Line R. R.	1,137,669	* 1,171,889	2,554,586	325,698
Baltimore & Ohio R. R.	* 860,806	* 3,440,671	4,065,058	1,261,123
Boston & Maine R. R.	* 2,591,896	* 462,726	* 1,497,997	623,424
Central of Georgia Ry.†	* 1,653,095	* 1,831,361	* 1,139,839	* 1,285,928
Central R. R. of New Jersey	* 2,240,784	* 1,173,403	* 1,222,017	* 79,817
Chesapeake & Ohio Ry.	24,927,483	17,701,259	30,540,178	23,127,168
Chicago & Eastern Illinois Ry.‡	* 762,655	* 1,263,949	* 368,700	* 858,240
Chicago & North Western Ry.‡	* 9,958,405	* 9,482,242	* 6,663,529	* 6,128,180
Chicago, Burlington & Quincy R. R.	1,029,253	* 3,068,821	4,086,386	22,369
Chicago Great Western R. R.‡	* 295,094	* 1,120,513	38,010	* 774,801
Chicago, Milwaukee, St. Paul & Pacific R. R.‡	*11,116,337	*15,264,538	* 7,536,176	*11,527,047
Chicago, Rock Island & Pacific Ry.‡	*10,431,614	*10,892,493	* 7,569,536	* 7,947,353
Chicago, St. Paul, Minneapolis & Omaha Ry.	* 1,383,557	* 2,013,888	* 985,877	* 1,595,942
Delaware & Hudson R. R.	* 1,220,767	* 1,966,331	* 486,264	* 1,282,582
Delaware, Lackawanna & Western R. R.	* 952,564	* 2,799,730	827,556	* 999,738
Denver & Rio Grande Western R. R.‡	* 3,896,910	* 3,507,369	* 3,127,394	* 2,710,958
Elgin, Joliet & Eastern Ry.	957,277	892,721	1,556,566	1,485,021
Erie R. R. (including Chicago & Erie R. R.)	575,771	* 1,841,948	3,166,007	827,463
Grand Trunk Western R. R.	287,288	* 521,956	1,040,719	194,798
Great Northern Ry.	777,052	* 1,708,116	3,226,445	717,113
Illinois Central R. R.	* 2,325,114	* 3,911,393	2,048,047	558,449
Lehigh Valley R. R.	444,401	* 1,958,307	1,975,257	* 395,467
Long Island R. R.	* 241,488	* 781,709	534,969	15,724
Louisville & Nashville R. R.	4,895,982	1,854,660	7,683,124	4,699,027
Minneapolis, St. Paul & Sault Ste. Marie Ry.	* 3,943,946	* 4,397,823	* 3,128,829	* 3,642,003
Missouri-Kansas-Texas Lines	* 1,367,840	* 3,103,633	* 511,224	* 2,238,319
Missouri Pacific R. R.‡	* 6,799,066	*11,349,987	* 3,999,361	* 8,486,797
New York Central R. R.¶	2,367,932	* 6,662,976	13,165,526	4,431,776
New York, Chicago & St. Louis R. R.	1,733,026	* 267,135	2,762,839	817,871
New York, New Haven & Hartford R. R.‡	* 4,937,161	* 2,293,970	* 2,641,947	* 15,502
Norfolk & Western Ry.	19,683,978	13,933,839	22,636,012	16,936,892
Northern Pacific Ry.	* 5,172,097	* 7,409,085	* 3,068,104	* 5,281,140
Pennsylvania R. R.	19,443,068	12,277,296	34,021,070	26,792,711
Pere Marquette Ry.	1,264,588	238,475	2,954,127	1,953,522
Pittsburgh & Lake Erie R. R.	2,838,292	2,052,394	4,041,804	3,262,675
Reading Co.	3,976,918	2,743,335	6,098,392	4,779,474
St. Louis-San Francisco Ry.‡	* 5,402,911	* 7,819,447	* 3,255,439	* 5,715,835
St. Louis Southwestern Lines‡	* 292,837	* 540,100	111,046	* 125,997
Seaboard Air Line Ry.†	* 4,718,873	* 4,959,456	* 3,465,628	* 3,710,819
Southern Ry.	1,011,735	* 3,222,307	3,175,319	* 1,247,906
Southern Pacific Transportation System‖	2,754,506	* 2,630,409	7,989,288	2,466,372
Texas & Pacific Ry.	839,376	355,380	1,617,630	1,159,616
Union Pacific R. R.	6,470,094	5,914,877	10,773,745	10,205,295
Wabash Ry.†	* 1,772,595	* 2,307,501	* 350,809	* 863,340
Yazoo & Mississippi Valley R. R.	* 367,645	* 1,289,965	* 24,321	* 944,171

† Report of receiver or receivers.
‡ Report of trustee or trustees.
§ Includes Atchison, Topeka & Santa Fe Ry., Gulf, Colorado & Santa Fe Ry., and Panhandle & Santa Fe Ry.
¶ Includes Boston & Albany, lessor to New York Central R. R.
‖ Includes Southern Pacific Company and Texas & New Orleans R. R. The operation of all separately operated solely controlled affiliated companies, resulted in a net deficit of $2,280,333 for eight months of 1936, and $2,561,213 for eight months of 1935. These figures are not reflected in this statement.
* Deficit.

of $16,384,500 for the eight months period ended August 31, as compared with a net deficit of $79,815,256 for the corresponding period of last year. For August 79 Class I roads reported a net income while 55 reported net deficits, according to the commission's monthly compilation of selected income and balance-sheet items. For eight months 61 roads reported a net income and 74 reported deficits. The consolidated statement and a statement of the net income of the roads having annual operating revenues above $25,000,000 are given in the accompanying tables.

Railroad Discussions at Academy of Political Science Meeting

The annual meeting of the Academy of Political Science to be held at the Hotel Astor, New York, on November 12, will consist of three sessions devoted to a consideration of transportation developments in the United States.

The morning session, over which William L. Ransom, trustee of the Academy of Political Science, will preside, will be devoted to discussions of "Railroads and the National Economy" by William J. Cunningham, professor of transportation, Harvard University; Frederick E. Williamson, president of the New York Central; Lloyd K. Garrison, dean of the Law School, University of Wisconsin; and Virgil Jordan, president of the National Industrial Conference Board. Also, brief discussions by William Green, president of the American Federation of Labor, and Winthrop M. Daniels, professor emeritus of transportation, Yale University.

The afternoon session, with its topic "The Railroad Situation Critically Analyzed," will include discussions by Robert V. Fletcher, vice-president and general counsel, Association of American Railroads; Thomas F. Woodlock, contributing editor of the Wall Street Journal and former member of the Interstate Commerce Commission; Henry S. Sturgis, vice-president of the First National Bank of New York; and Thomas I. Parkinson, president of the Equitable Life Assurance Society. Also, a brief discussion by Dr. Carson S. Duncan, economist, Association of American Railroads. Dr. Wesley C. Mitchell, professor of economics, Columbia University, and director of the National Bureau of Economic Research, will preside at this session.

At the annual dinner meeting the topic will be "Transportation Problems and Suggestions Toward a Constructive Solution," with Thomas W. Lamont, of J. P. Morgan & Company, presiding, and addresses by Joseph B. Eastman, member of the Interstate Commerce Commission and former federal co-ordinator of transportation; and Samuel T. Bledsoe, president and chairman of the executive committee of the Atchison, Topeka & Santa Fe.

Find No Fraud In Operation of Milwaukee

In a comprehensive report on the history of the Chicago, Milwaukee, St. Paul & Pacific, George I. Haight and Walter J. Cummings, two trustees of the road, have informed Federal Judge James H. Wilkerson, at Chicago, that they could not find any facts pertaining to irregularities, fraud, misconduct or mismanagement in the operation of the road, as charged several months ago by Julian Weiss, a New York attorney representing dissenting bondholders, in objecting to the appointment of H. A. Scandrett as trustee of the road. Mr. Scandrett, it was charged, was dominated by Kuhn, Loeb & Company. Judge Wilkerson, in an order entered June 8, ordered the trustees to investigate the charges and report their findings to the court. The report consisted of 110 pages, which discussed in detail six major steps in the development of the road: (1) the Gary purchase, (2) the Terre Haute matter, (3) the Milwaukee Land Company, (4) the Chicago, Milwaukee & Puget Sound Railway Company, (5) electrification, and (6) electric power and power contracts. The trustees, however, stated that some of the investments of the road were unwise and unprofitable, citing as an example the acquisition of the Chicago, Milwaukee & Gary, which lost money continuously from 1913 to December 29, 1921, when the purchase was approved by the board of directors. The justifications for its purchase, according to the trustees, can be found only in the reasons given for its acquirement, these being the benefits the directors thought would accrue to the system.

Employees of C. & O. Discuss Relations With Public

The Chesapeake & Ohio held its sixth annual public relations conference at The Greenbrier, White Sulphur Springs, W. Va., on October 30-31 with some 300 officers, employees and visitors.

The delegates were welcomed to West Virginia by the two contestants for the governorship of that state, following which the session was formally opened by President Harahan. He was followed by Colonel H. E. Stephenson, special assistant in the legal department of the Pennsylvania, whose address was entitled "Frankly Speaking." "Progress in Transportation" was the topic discussed by Vice-President George D. Brooke, following which George A. Kelly, vice-president of the Pullman Company, delivered an address on "Who Pays Taxes?" Other speakers at the morning session on the first day were W. C. Hull, assistant vice-president, whose talk was entitled "The Friendly Ambassador"; and J. M. Fitzgerald, vice-chairman, of the Eastern Railways' Public Relations Committee, who discussed Government Ownership.

On the afternoon of the first day of the conference, the session was opened by

Colonel W. S. Battle, retired vice-president of the Norfolk & Western, who was followed by the following speakers, each of whom spoke on "Public Relations as We See It.":

G. R. James, general attorney, Erie.

W. J. Stevenson, general solicitor, Nickel Plate.

Seward L. Merriam, general counsel, Pere Marquette.

In the evening there was a banquet at which the Chesapeake & Ohio's film portraying the mining and transportation of coal was shown, with a musical presentation by the Chesapeake & Ohio quartette.

On the second day of the conference the first speaker was K. N. Merritt, general sales manager of the Railway Express Agency, who spoke on "Public Relations Opportunities." He was followed by Miss Laura Armitage, assistant director of public relations for the railway, who presented the report of that department. Next came an address by Colonel R. S. Henry, assistant to the president of the Association of American Railroads, who gave a showing of the A.A.R.'s new public relations voca-film.

The committees on taxation, legislation, passenger solicitation and freight solicitation then reported, following which each county public relations chairman was called upon and introduced to the conference. H. P. Henshaw, assistant to vice-president, presided at the sessions.

Meetings & Conventions

The following list gives names of secretaries, date of next or regular meetings, and places of meetings:

AIR BRAKE ASSOCIATION.—T. L. Burton, Room 3400, Empire State Bldg., New York, N. Y.

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, 836 S. Michigan Ave., Chicago, Ill. To meet with Air Brake Association, Car Department Officers' Association, International Railway Master Blacksmiths' Association, International Railway General Foremen's Association and the Master Boiler Makers' Association.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—W. R. Curtis, F. T. R., M. & O. R. R., Chicago, Ill.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 816 McCormick Bldg., Chicago, Ill.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York, N. Y. Annual meeting, November 12-13, 1936, Roosevelt Hotel, New Orleans, La.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—F. O. Whiteman, Union Station, St. Louis, Mo. Annual meeting, June 15-17, 1937, Chicago, Ill.

AMERICAN ASSOCIATION OF RAILWAY ADVERTISING AGENTS.—E. A. Abbott, Poole Bros., Inc. 85 W. Harrison St., Chicago, Ill. Annual meeting, January 15-16, 1937.

AMERICAN ASSOCIATION OF SUPERINTENDENTS OF DINING CARS.—F. R. Borger, C. I. & L. Ry., 836 S. Federal St., Chicago, Ill.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, 319 N. Waller Ave., Chicago, Ill. Annual meeting, 1937, Chicago, Ill. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY CAR INSTITUTE.—W. C. Tabbert, 19 Rector St., New York, N. Y.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—E. J. Hoddy, Louisville & Nashville R. R., Louisville, Ky.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—Works in co-operation with the Association of American Railroads, Division IV.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 16-18, 1937, Palmer House, Chicago, Ill.

AMERICAN RAILWAY MAGAZINE EDITORS' ASSOCIATION.—M. W. Jones, Baltimore & Ohio R. R., Baltimore, Md.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, C., M., St. P. & P. R. R., 11402 Calumet Ave., Chicago, Ill.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—R. E. Schindler, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—C. E. Davies, 29 West 39th St., New York, N. Y. Annual meeting, Nov. 30-Dec. 4, 1936, New York, N. Y.
Railroad Division.—Marion B. Richardson, 192 E. Cedar St., Livingston, N. J.

AMERICAN TRANSIT ASSOCIATION.—Guy C. Hecker, 292 Madison Ave., New York, N. Y.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—H. L. Dawson, 1427 Eye St., N. W., Washington, D. C. Annual meeting, January 26-28, 1937, New Orleans, La.

ASSOCIATION OF AMERICAN RAILROADS.—H. J. Forster, Transportation Bldg., Washington, D. C.
Operations and Maintenance Department.—J. M. Symes, Vice-President, Transportation Bldg., Washington, D. C.
Division I.—Operating.—J. C. Caviston, 30 Vesey St., New York, N. Y.
Freight Station Section.—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York N. Y.
Protective Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.
Safety Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.
Telegraph and Telephone Section.—W. A. Fairbanks, 30 Vesey St., New York, N. Y. Next meeting, Oct. 5-7, 1937, Chicago, Ill.
Division II.—Transportation.—L. R. Knott, 59 E. Van Buren St., Chicago, Ill.
Division IV.—Engineering.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 16-18, 1937, Palmer House, Chicago, Ill.
Construction and Maintenance Section.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill. Annual meeting, March 16-18, 1937, Palmer House, Chicago, Ill.
Electrical Section.—E. H. Fritch, 59 E. Van Buren St., Chicago, Ill.
Signal Section—R. H. C. Balliet, 30 Vesey St., New York, N. Y. Annual meeting, March 15-16, 1937, Hotel Stevens, Chicago, Ill.
Division V.—Mechanical.—V. R. Hawthorne, 59 E. Van Buren St., Chicago, Ill.
Division VI.—Purchases and Stores.—W. J. Farrell, 30 Vesey St., New York, N. Y.
Division VII.—Freight Claims.—Lewis Pilcher, 59 E. Van Buren St., Chicago, Ill. Annual meeting, 1937, Toronto, Ontario, Canada.
Division VIII.—Motor Transport—George M. Campbell, Transportation Bldg., Washington, D. C.
Car-Service Division.—C. A. Buch, Transportation Bldg., Washington, D. C.
Traffic Department.—A. F. Cleveland, Vice-President, Transportation Bldg., Washington, D. C.
Finance, Accounting, Taxation and Valuation Department.—E. H. Bunnell, Vice-President, Transportation Bldg., Washington, D. C.
Accounting Division.—E. R. Ford, Transportation Bldg., Washington, D. C.
Treasury Division.—E. R. Ford, Transportation Bldg., Washington, D. C.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—F. L. Johnson, Chief Clerk and Claim Agent, General Claims Dept., Alton R. R., 340 W. Harrison St., Chicago, Ill. Annual meeting, May, 1937, Cincinnati, Ohio.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., 1519 Daily News Bldg., 400 W. Madison St., Chicago, Ill. Exhibit by Railway Electrical Supply Manufacturers' Association.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—W. S. Carlisle, National Lead Company, 900 W. 18th St., Chicago, Ill. Meets with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—C. R. Crook, 2271 Wilson Ave., N. D. G., Montreal, Que. Regular meetings, second Monday of each month, except June, July and August, Windsor Hotel, Montreal, Que.

CAR DEPARTMENT OFFICERS' ASSOCIATION.—A. S. Sternberg, M. C. B. Belt Ry. of Chicago, 7926 S. Morgan St., Chicago, Ill.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, 2514 W. 55th St., Chicago, Ill. Regular meetings, second Monday of each month, except June, July and August, La Salle Hotel, Chicago, Ill.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—E. G. Bishop, Illinois Central System, East St. Louis, Ill. Regular meetings, third Tuesday of each month except June, July and August, Hotel Statler, St. Louis, Mo.

CENTRAL RAILWAY CLUB OF BUFFALO.—Mrs. M. D. Reed, 1817 Hotel Statler, McKinley Square, Buffalo, N. Y. Regular meetings, second Thursday of each month except June, July and August, Hotel Statler, Buffalo, N. Y.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—(See Railway Fuel and Traveling Engineers' Association.)

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha St., Winona, Minn.

INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—A. F. Stiglmeier, 29 Parkwood St., Albany, N. Y.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.—Clyde S. Bailey, 810 18th St., N. W., Washington, D. C. Annual meeting, November 10-13, 1936, Marlborough-Blenheim Hotel, Atlantic City, N. J.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. H. White (Pres. and Sec'y), Room 1826, 208 S. La Salle St., Chicago, Ill. Exhibit at A. R. E. A. Convention, March 16-18, 1937, The Coliseum, Chicago, Ill.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, second Tuesday of each month, except June, July, August and September, Hotel Touraine, Boston, Mass.

NEW YORK RAILROAD CLUB.—D. W. Pye, 30 Church St., New York, N. Y. Regular meetings, third Friday of each month, except June, July and August, 29 W. 39th St., New York, N. Y.

PACIFIC RAILWAY CLUB.—William S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month, alternately at San Francisco and Oakland, excepting June at Los Angeles and October at Sacramento.

RAILWAY BUSINESS ASSOCIATION.—P. H. Middleton (Treas. and Asst. Sec'y), First National Bank Bldg., Chicago, Ill.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 1941 Oliver Bldg., Pittsburgh, Pa. Regular meetings, fourth Thursday of each month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. McC. Price, Allen-Bradley Company, 600 W. Jackson Blvd., Chicago, Ill. Meets with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—P. A. Bissell, 40 Broad St., Boston, Mass.

RAILWAY FUEL AND TRAVELING ENGINEERS' ASSOCIATION.—T. Duff Smith, 1660 Old Colony Bldg., Chicago, Ill.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1941 Oliver Bldg., Pittsburgh, Pa. Meets with Mechanical Division, Purchases and Store Division, and Motor Transport Division, Association of American Railroads.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with Telegraph and Telephone Section of A. A. R., Division 1.

RAILWAY TIE ASSOCIATION.—Roy M. Edmonds, 1438 Syndicate Trust Bldg., St. Louis, Mo.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—T. F. Donahoe, Gen. Supvr. Road, Baltimore & Ohio, Pittsburgh, Pa. Annual meeting, 1937, Chicago, Ill.

SIGNAL APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Company, 30 Church St., New York, N. Y. Meets with A. A. R., Signal Section.

SOCIETY OF OFFICERS, UNITED ASSOCIATIONS OF RAILROAD VETERANS.—M. W. Jones, Baltimore & Ohio, Mt. Royal Station, Baltimore, Md.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, 4 Hunter St., S. E., Atlanta, Ga. Regular meetings, third Thursday in January, March, May, July, September and November, Ansley Hotel, Atlanta, Ga.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—R. G. Parks, A. B. & C. R. R., Atlanta, Ga.

TOOL FOREMEN SUPPLIERS' ASSOCIATION.—E. E. Caswell, Union Twist Drill Co., 11 S. Clinton St., Chicago, Ill. Meets with American Railway Tool Foremen's Association.

TORONTO RAILWAY CLUB.—R. H. Burgess, P. O. Box 8, Terminal "A," Toronto, Ont. Regular meetings, fourth Monday of each month, except June, July and August, Royal York Hotel, Toronto, Ont.

TRACK SUPPLY ASSOCIATION.—D. J. Higgins, Gardner-Denver Company, 332 S. Michigan Ave., Chicago, Ill. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—(See Railway Fuel and Traveling Engineers' Association.)

WESTERN RAILWAY CLUB.—C. L. Emerson, C. M., St. P. & P., Chicago, Ill. Regular meetings third Monday of each month, except June, July, August and September, Hotel Sherman, Chicago, Ill.

Equipment and Supplies

1936 Equipment Orders Now Double 1935 Totals

Business in locomotive and freight car fields reached that level in October

Domestic orders for 22 locomotives, 1,310 freight cars and 5 passenger-train cars were reported in October issues of *Railway Age*. This business of last month in the locomotive and freight car field brings the 1936 orders for all three classes of rolling stock to a point where it is twice the volume of business placed throughout 1935, passenger-train car orders having been at that level since the end of July. Also, rail orders reported up to the end of October have involved an aggregate tonnage which is one-third greater than that placed throughout last year.

The 22 locomotives ordered in October brings this year's total to date to 180 as compared with the 83 locomotives ordered during the entire 12 months of 1935. These figures are exclusive of power units for streamlined trains. The 1936 ten months total also exceeds that for the entire twelve months of any year since 1930 except 1934, when 183 locomotives were ordered. Furthermore, in the steam locomotive field this year's business is five times that of 1935, the comparative figures being 143 and 28. On November 1 inquiries were outstanding for 142 locomotives for domestic service and 13 for export and plans had been announced for the acquisition of 5 others for domestic service.

The October orders for 1,310 freight cars made a total of 38,664 for the first ten months of 1936. As stated above, this is more than twice the 18,699 freight cars ordered during the twelve months of 1935 and is a larger volume than that reported for any full year since 1930 when orders for 46,360 freight cars were reported. Furthermore, as has been pointed out in previous monthly stories there have been 1936 export orders for 516 freight cars, a better export volume than that of any year since 1930, except 1934. At the close of last month inquiries were outstanding for 1,200 freight cars for domestic service and 1,100 for export while plans had been announced for the purchase of more than 3,300 others for domestic service.

The 5 passenger-train car orders reported in October constituted the first business in this field since July. Thus far in 1936 a total of 146 passenger-train cars has been ordered, exclusive of articulated units for streamlined trains. This compares with the 63 passenger-train cars ordered throughout 1935 and makes 1936 the best year since 1930, with the exception of 1934 when 388 passenger-train cars were ordered. On November 1 inquiries were outstanding for 18 passenger-train cars for domestic service while in addition one road had announced plans for the acquisition of six streamlined trains.

Rail orders reported last month aggregated 110,237 tons, which is the largest volume reported for any month this year except January and February. The 1936 total is now 662,822 tons and compares with the 495,300 tons placed throughout 1935.

Domestic Equipment Orders Reported in Issues of the Railway Age in October, 1936

LOCOMOTIVES

Date	Name of company	No.	Type	Builder
Oct. 10	Universal Atlas Cement Co.	1	Diesel-electric switching	American Locomotive Co.
Oct. 10	Detroit & Toledo Shore Line	1	2-8-2	Lima Locomotive Works
Oct. 17	Boston & Maine	5	Mountain	Baldwin Locomotive Works
		5	Pacific	Lima Locomotive Works
Oct. 31	Kansas City Southern	10	2-10-4	Lima Locomotive Works

FREIGHT CARS

Oct. 10	Bethlehem Steel Co.	100	Hopper	Company shops
Oct. 17	Cincinnati, New Orleans & Texas Pacific	10	Dump	Pressed Steel Car Co.
Oct. 24	St. Louis Southwestern	50	Flat	American Car & Foundry
Oct. 24	Kennecott Copper Corp.	250	Ore	Pressed Steel Car Co.
Oct. 31	Kansas City Southern	500	Box	Pullman-Standard
		300	Box	Gen. American Trans. Corp.
		100	Gondola	Mt. Vernon Car Manu. Co.

PASSENGER-TRAIN CARS

Oct. 31	Kansas City Southern	4	Coaches	Pullman-Standard
		1	Dining-chair	

Union Pacific $8,000,000 Equipment Program

The Union Pacific will spend $6,500,000 for locomotives and cars and $1,500,000 for car rehabilitation and construction in company shops. An order for 20 4-8-4 type locomotives, costing approximately $3,000,000 has been placed with the American Locomotive Company. Inquiries have been issued for 40 coaches and five dining cars of the coffee-shop type for use on the Challenger to cost $3,500,000. A total of $500,000 will be spent in modernizing and air conditioning 40 passenger cars in the Omaha shops, beginning November 15th. On December 1st work will be started on the construction of 300 fifty-ft. automobile cars equipped with auto loaders. An inquiry has been issued for 300 underframes.

Western Pacific 1937 Improvement Program

The Western Pacific, following approval by the federal district court on October 28, will spend $7,000,000 for improvements to road and equipment and for the purchase of new locomotives and freight cars in 1937. Of the total $4,465,955 is for improvements to road and equipment and $2,605,000 is for the purchase of new locomotives and freight cars. These expenditures authorized by the court represent the second phase of a three-year program of improvements which was initiated shortly after the beginning of this year and which will involve an ultimate aggregate outlay of more than $14,000,000 for improvements and new equipment. It is expected that this improvement program will be completed during 1938.

The 1937 improvement program is as follows:

Re-laying of 172 mi. of track in California, Nevada and Utah with 100-lb. and 112-lb. rail and fastenings, at a total cost of $2,121,753. This includes the laying of 40 miles of 112-lb. rail in the Feather River canyon, Cal., and when this is completed the entire 116 mi. of the canyon, between Oroville and Portola, will be 112-lb. rails.

Extension of passing tracks in the Feather River Canyon, at a cost of $61,187.

Re-ballasting of 93 mi. of track in California, Nevada and Utah with crushed rock and gravel, at a cost of $387,297.

Strengthening of bridges, at a cost of $100,000.

Engine terminal improvements, installation of additional stalls with drop pits, and enlarged turntables at Oroville, Cal., Elko, Nev. and Wendover, Utah, at a cost of $266,068.

Miscellaneous improvements to water supply, buildings, bridges and tracks, at an expenditure of $386,000.

Heavy repairs and improvements to equipment include: The substitution of steel sides and doors for wooden sides and doors on 100 box cars, at a cost of $149,300;

The installation of Evans loaders on 50 automobile cars, at a cost of $49,500;

Repairs to 500 box cars, at a cost of $200,000;

Conversion of 100 forty-foot box cars into single-deck stock cars, at a cost of $36 000;

Conversion of 100 thirty-six-foot single-deck stock cars into double-deck cars, at a cost of $14,000;

The substituting of cast steel side frames for arch bar trucks on 2,520 freight cars, at a cost of $525,033;

The modernizing of passenger cars and the installation of air-conditioning equipment, at a cost of $39,817;

The installation of modern economy and efficiency devices on locomotives, at a cost of $25,000;

Additional tools and appliances for the company's general shops at Sacramento, Cal., and for various roundhouses, at a cost of $105,000.

Expenditures for new motive power and new equipment include:

The purchase of seven 4-6-6-4 high-speed freight locomotives for service in Nevada and Utah, and four 2-8-8-2 type locomotives for service in the Feather River Canyon, Cal., at a cost of $1,580,000;

The purchase of two hundred 40-ft., 50-ton box cars; fifty 50-ft., 50-ton flat

Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr. & retir. 1936	1935	Before depr. & ret.
Chicago, Mil., St. Paul & Pac.	Sept.	11,128	$8,228,615	$697,271	$9,800,470	$2,107,185	$1,614,020	$232,977	$3,360,148	$7,638,181	77.9	$2,162,289	$1,484,289	$877,912	$806,938	$1,322,183
	9 mos.	11,127	67,160,006	5,501,944	79,981,772	14,586,812	14,628,547	1,915,176	30,049,424	64,158,189	80.2	15,823,583	9,665,583	4,954,010	741,945	8,978,442
Chicago, Rock Island & Pacific	Sept.	7,576	4,935,420	623,170	6,190,988	1,094,690	1,287,002	204,771	2,464,972	5,409,553	87.4	781,435	324,057	41,927	274,048	393,168
	9 mos.	7,575	43,976,817	5,148,296	54,501,551	7,632,102	12,969,712	1,792,513	22,859,647	48,742,455	89.4	5,759,096	1,603,607	—1,051,121	—1,277,609	2,162,198
Chicago, Rock Island & Gulf	Sept.	626	232,672	29,433	342,385	56,895	37,678	16,391	129,425	265,921	77.7	76,464	53,843	—2,993	3,227	882
	9 mos.	626	2,271,018	249,857	3,215,645	499,677	316,454	145,211	1,148,324	2,344,655	72.9	870,990	671,084	187,595	1,764	223,803
Chicago, St. Paul, Minn. & Omaha	Sept.	1,648	1,369,842	153,721	1,633,822	217,000	275,559	33,546	694,940	1,298,407	79.5	335,415	233,193	83,385	170,934	132,647
	9 mos.	1,648	11,452,977	1,222,338	13,630,803	1,625,168	2,345,811	316,350	6,337,833	11,325,606	83.1	2,305,197	1,389,156	337,804	—171,405	784,746
Clinchfield Railroad	Sept.	309	494,168	4,587	504,037	35,510	130,775	17,997	93,172	291,060	57.7	212,977	164,433	213,057	180,643	255,667
	9 mos.	309	4,407,587	40,656	4,496,945	345,297	1,058,523	157,291	881,420	2,571,484	57.2	1,925,461	1,503,992	1,853,489	1,328,093	2,243,507
Colorado & Southern	Sept.	956	610,722	48,761	714,340	86,036	99,854	21,484	265,708	508,106	71.1	206,234	140,461	106,163	52,882	137,530
	9 mos.	999	4,469,631	312,924	5,260,427	667,508	997,053	126,060	2,108,604	4,212,817	80.1	1,047,610	474,166	261,297	—116,696	545,469
Ft. Worth & Denver City	Sept.	902	459,192	59,901	518,311	51,922	77,105	25,611	161,699	350,867	67.7	167,444	131,780	92,223	116,675	109,501
	9 mos.	902	3,859,394	421,101	4,286,540	402,503	748,610	169,457	1,373,098	3,013,935	70.3	1,272,605	963,238	678,498	312,522	836,668
Columbus & Greenville	Sept.	167	107,565	8,714	124,078	16,836	16,403	4,546	40,810	88,729	71.5	35,349	31,202	25,139	15,914	27,921
	9 mos.	167	731,282	58,693	839,897	152,970	136,631	34,754	320,384	735,033	87.5	104,864	72,552	56,327	—8,246	81,444
Delaware & Hudson	Sept.	831	1,937,025	127,549	2,155,460	283,461	490,823	45,083	729,319	1,679,165	77.9	476,295	332,403	322,676	180,027	412,821
	9 mos.	831	16,719,935	905,975	18,416,061	2,493,420	4,485,437	410,694	6,836,449	15,420,838	83.7	2,995,223	1,774,638	1,831,204	1,167,960	2,655,852
Delaware, Lackawanna & Western	Sept.	984	2,957,809	588,720	4,071,763	347,622	808,712	108,376	1,737,517	3,150,099	77.4	921,664	586,664	571,730	542,235	793,118
	9 mos.	987	27,123,882	5,217,224	36,527,237	3,480,667	6,947,929	1,033,314	16,446,180	29,512,226	80.8	7,015,011	4,002,011	3,853,756	2,000,836	5,855,264
Denver & Rio Grande Western	Sept.	2,584	2,388,323	158,634	2,663,056	418,857	540,864	52,514	868,441	1,926,661	72.3	736,395	557,031	441,370	447,795	537,084
	9 mos.	2,584	15,912,421	1,160,401	17,962,989	3,137,711	4,991,618	475,368	6,177,986	15,397,917	85.7	2,565,072	878,784	275,968	716,590	1,141,198
Denver & Salt Lake	Sept.	232	278,519	6,411	296,140	49,579	40,980	2,372	67,864	158,559	53.5	137,581	115,959	154,920	175,227	169,129
	9 mos.	232	1,730,304	69,619	1,880,858	338,980	563,163	20,842	503,269	1,450,573	77.1	430,285	247,520	604,606	812,321	659,949
Detroit & Mackinac	Sept.	242	68,658	3,106	79,262	8,397	14,454	921	24,936	52,396	66.1	26,866	24,259	19,723	21,771	22,587
	9 mos.	242	461,296	27,516	544,911	94,720	102,717	8,375	207,202	443,619	81.4	101,292	87,898	57,935	22,760	84,217
Detroit & Toledo Shore Line	Sept.	50	253,255	.....	254,727	24,679	26,101	7,670	61,253	127,451	50.0	127,276	102,884	57,649	84,382	63,208
	9 mos.	50	2,798,644	.....	2,812,010	251,903	230,618	70,166	680,892	1,300,382	46.2	1,511,628	1,239,550	752,475	699,838	802,508
Detroit, Toledo & Ironton	Sept.	472	501,188	249	525,582	69,036	92,735	10,542	120,352	318,689	60.6	206,893	169,322	140,532	179,211	161,860
	9 mos.	472	5,635,088	2,247	5,788,295	568,596	748,361	95,245	1,232,514	2,870,058	49.6	2,918,237	2,354,255	2,024,927	2,441,649	2,219,905
Duluth, Missabe & Northern	Sept.	556	2,772,783	3,250	3,201,930	185,807	220,189	4,126	393,485	845,458	26.4	2,356,472	2,383,932	2,379,530	954,732	2,454,202
	9 mos.	558	12,579,806	23,727	14,433,891	1,336,085	1,908,080	34,495	2,314,319	5,996,307	41.5	8,437,584	7,115,863	7,106,693	3,922,461	7,780,516
Duluth, Winnipeg & Pacific	Sept.	178	104,252	1,955	110,074	19,366	15,801	1,748	41,220	83,260	75.6	26,814	19,130	8,455	—16,300	11,458
	9 mos.	178	965,107	18,861	1,011,747	220,155	159,941	16,154	403,954	839,981	83.0	171,766	102,643	—38,114	—138,990	—9,850
Elgin, Joliet & Eastern	Sept.	434	1,285,230	12	1,562,299	143,615	334,805	14,360	552,726	1,091,613	69.9	470,686	438,255	384,784	172,960	459,059
	9 mos.	434	11,631,918	46	13,578,784	1,265,821	2,916,072	124,690	4,830,569	9,546,487	70.3	4,032,297	3,013,280	2,720,174	1,917,531	3,393,738
Erie	Sept.	2,297	6,311,110	469,593	7,343,770	682,676	1,331,153	173,186	2,499,872	4,981,884	67.8	2,361,886	1,833,301	1,466,448	1,392,755	1,790,561
	9 mos.	2,297	53,060,118	4,013,738	61,764,507	5,350,071	11,572,003	1,526,293	22,398,757	43,568,225	70.5	18,196,282	14,014,331	11,527,551	8,593,228	14,441,900
New Jersey & New York	Sept.	45	13,534	44,704	60,368	5,321	15,494	479	45,632	68,647	113.7	—8,279	—13,529	—28,922	—29,879	—28,911
	9 mos.	45	141,116	426,496	585,366	46,111	137,469	5,563	435,229	640,670	109.4	—55,304	—99,334	—243,741	—321,153	—243,642
New York, Susque. & Western	Sept.	215	235,325	23,410	271,033	23,255	33,189	5,002	113,816	188,484	69.5	82,549	57,506	29,063	21,239	34,578
	9 mos.	215	2,253,823	217,655	2,582,756	234,674	319,989	43,075	1,121,067	1,840,418	71.3	742,338	526,922	270,385	268,419	321,736
Florida East Coast	Sept.	712	294,446	87,218	430,451	94,124	137,414	18,701	164,021	460,090	106.9	—29,639	—108,545	—130,481	—195,186	—91,719
	9 mos.	712	3,931,237	1,826,123	6,458,392	903,962	1,185,178	198,284	2,090,118	4,860,463	75.3	1,597,929	890,816	531,576	—133,369	1,029,121
Fort Smith & Western	Sept.	249	74,274	945	78,160	16,068	8,116	6,400	23,089	56,571	72.4	21,589	20,589	11,829	—93	12,395
	9 mos.	249	520,748	9,110	559,099	139,532	76,718	50,372	182,786	477,989	85.5	81,110	68,329	5,006	—64,626	10,116
Georgia Railroad	Sept.	329	292,312	15,329	334,096	25,603	61,590	18,470	130,467	249,699	74.7	84,397	78,032	85,515	70,353	96,623
	9 mos.	329	2,357,137	130,146	2,698,473	260,846	546,069	157,095	1,144,772	2,231,587	82.7	466,886	409,956	485,271	413,884	587,454
Georgia & Florida	Sept.	408	90,310	3,526	98,074	24,381	17,357	8,704	37,556	93,732	95.6	4,342	—2,880	—5,433	—2,773	—156
	9 mos.	408	826,547	23,648	885,503	212,607	154,414	75,811	324,119	818,082	92.4	67,421	6,602	—8,882	25,918	38,319
Grand Trunk Western	Sept.	1,032	1,389,844	84,769	1,618,392	311,747	351,055	34,178	700,126	1,471,655	90.9	146,737	25,818	—158,662	244,152	—69,866
	9 mos.	1,032	15,507,583	688,177	17,451,493	2,259,004	3,297,762	317,170	6,851,941	13,493,045	77.3	3,958,448	2,977,259	1,956,516	1,506,880	2,798,743
Canadian Nat'l Lines in New Eng.	Sept.	172	108,274	7,938	125,422	38,845	19,506	2,344	65,651	135,000	110.0	—9,578	—25,050	—51,923	—43,891	—48,963
	9 mos.	172	859,427	59,459	1,002,871	358,842	181,349	21,896	539,981	1,183,888	118.0	—181,017	—314,575	—553,941	—546,459	—527,144
Great Northern	Sept.	8,155	8,614,198	419,077	9,815,615	848,477	1,215,425	174,712	2,717,792	5,254,855	53.5	4,560,760	3,847,856	3,594,468	4,600,859	3,896,879
	9 mos.	8,212	55,959,248	3,766,758	65,235,833	6,627,568	10,469,298	1,613,428	21,110,504	42,338,285	64.9	22,897,548	17,104,220	16,244,222	14,966,243	18,996,026

Continued on next left-hand page

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Domestic orders for 22 locomotives, 1,310 freight cars and 5 passenger-train cars were reported in October issues of *Railway Age*. This business of last month in the locomotive and freight car field brings the 1936 orders for all three classes of rolling stock to a point where it is twice the volume of business placed throughout 1935, passenger-train car orders having been at that level since the end of July. Also, rail orders reported up to the end of October have involved an aggregate tonnage which is one-third greater than that placed throughout last year.

The 22 locomotives ordered in October brings this year's total to date to 180 as compared with the 83 locomotives ordered during the entire 12 months of 1935. These figures are exclusive of power units for streamlined trains. The 1936 ten months total also exceeds that for the entire twelve months of any year since 1930 except 1934, when 183 locomotives were ordered. Furthermore, in the steam locomotive field this year's business is five times that of 1935, the comparative figures being 143 and 28. On November 1 inquiries were outstanding for 142 locomotives for domestic service and 13 for export and plans had been announced for the acquisition of 5 others for domestic service.

The October orders for 1,310 freight cars made a total of 38,664 for the first ten months of 1936. As stated above, this is more than twice the 18,699 freight cars ordered during the twelve months of 1935 and is a larger volume than that reported for any full year since 1930 when orders for 46,360 freight cars were reported. Furthermore, as has been pointed out in previous monthly stories there have been 1936 export orders for 516 freight cars, a better export volume than that of any year since 1930, except 1934. At the close of last month inquiries were outstanding for 1,200 freight cars for domestic service and 1,100 for export while plans had been announced for the purchase of more than 3,300 others for domestic service.

The 5 passenger-train car orders reported in October constituted the first business in this field since July. Thus far in 1936 a total of 146 passenger-train cars has been ordered, exclusive of articulated units for streamlined trains. This compares with the 63 passenger-train cars ordered throughout 1935 and makes 1936 the best year since 1930, with the exception of 1934 when 388 passenger-train cars were ordered. On November 1 inquiries were outstanding for 18 passenger-train cars for domestic service while in addition one road had announced plans for the acquisition of six streamlined trains.

Rail orders reported last month aggregated 110,237 tons, which is the largest volume reported for any month this year except January and February. The 1936 total is now 662,822 tons and compares with the 495,300 tons placed throughout 1935.

Domestic Equipment Orders Reported in Issues of the Railway Age in October, 1936

LOCOMOTIVES

Date	Name of company	No.	Type	Builder
Oct. 10	Universal Atlas Cement Co.	1	Diesel-electric switching	American Locomotive Co.
Oct. 10	Detroit & Toledo Shore Line	1	2-8-2	Lima Locomotive Works
Oct. 17	Boston & Maine	5	Mountain	Baldwin Locomotive Works
		5	Pacific	Lima Locomotive Works
Oct. 31	Kansas City Southern	10	2-10-4	Lima Locomotive Works

FREIGHT CARS

Oct. 10	Bethlehem Steel Co.	100	Hopper	Company shops
Oct. 17	Cincinnati, New Orleans & Texas Pacific	10	Dump	Pressed Steel Car Co.
Oct. 24	St. Louis Southwestern	50	Flat	American Car & Foundry
Oct. 24	Kennecott Copper Corp.	250	Ore	Pressed Steel Car Co.
Oct. 31	Kansas City Southern	500	Box	Pullman-Standard
		300	Box	Gen. American Trans. Corp.
		100	Gondola	Mt. Vernon Car Manu. Co.

PASSENGER-TRAIN CARS

Oct. 31	Kansas City Southern	4	Coaches	Pullman-Standard
		1	Dining-chair	

Union Pacific $8,000,000 Equipment Program

The Union Pacific will spend $6,500,000 for locomotives and cars and $1,500,000 for car rehabilitation and construction in company shops. An order for 20 4-8-4 type locomotives, costing approximately $3,000,000 has been placed with the American Locomotive Company. Inquiries have been issued for 40 coaches and five dining cars of the coffee-shop type for use on the Challenger to cost $3,500,000. A total of $500,000 will be spent in modernizing and air conditioning 40 passenger cars in the Omaha shops, beginning November 15th. On December 1st work will be started on the construction of 300 fifty-ft. automobile cars equipped with auto loaders. An inquiry has been issued for 300 underframes.

Western Pacific 1937 Improvement Program

The Western Pacific, following approval by the federal district court on October 28, will spend $7,000,000 for improvements to road and equipment and for the purchase of new locomotives and freight cars in 1937. Of the total $4,465,955 is for improvements to road and equipment and $2,605,000 is for the purchase of new locomotives and freight cars. These expenditures authorized by the court represent the second phase of a three-year program of improvements which was initiated shortly after the beginning of this year and which will involve an ultimate aggregate outlay of more than $14,000,000 for improvements and new equipment. It is expected that this improvement program will be completed during 1938.

The 1937 improvement program is as follows:

Re-laying of 172 mi. of track in California, Nevada and Utah with 100-lb. and 112-lb. rail and fastenings, at a total cost of $2,121,753. This includes the laying of 40 miles of 112-lb. rail in the Feather River canyon, Cal., and when this is completed the entire 116 mi. of the canyon, between Oroville and Portola, will be 112-lb. rails.

Extension of passing tracks in the Feather River Canyon, at a cost of $61,187.

Re-ballasting of 93 mi. of track in California, Nevada and Utah with crushed rock and gravel, at a cost of $387,297.

Strengthening of bridges, at a cost of $100,000.

Engine terminal improvements, installation of additional stalls with drop pits, and enlarged turntables at Oroville, Cal., Elko, Nev. and Wendover, Utah, at a cost of $266,068.

Miscellaneous improvements to water supply, buildings, bridges and tracks, at an expenditure of $386,000.

Heavy repairs and improvements to equipment include: The substitution of steel sides and doors for wooden sides and doors on 100 box cars, at a cost of $149,300;

The installation of Evans loaders on 50 automobile cars, at a cost of $49,500;

Repairs to 500 box cars, at a cost of $200,000;

Conversion of 100 forty-foot box cars into single-deck stock cars, at a cost of $36 000;

Conversion of 100 thirty-six-foot single-deck stock cars into double-deck cars, at a cost of $14,000;

The substituting of cast steel side frames for arch bar trucks on 2,520 freight cars, at a cost of $525,033;

The modernizing of passenger cars and the installation of air-conditioning equipment, at a cost of $39,817;

The installation of modern economy and efficiency devices on locomotives, at a cost of $25,000;

Additional tools and appliances for the company's general shops at Sacramento, Cal., and for various roundhouses, at a cost of $105,000.

Expenditures for new motive power and new equipment include:

The purchase of seven 4-6-6-4 high-speed freight locomotives for service in Nevada and Utah, and four 2-8-8-2 type locomotives for service in the Feather River Canyon, Cal., at a cost of $1,580,000;

The purchase of two hundred 40-ft., 50-ton box cars; fifty 50-ft., 50-ton flat

cars; 100 hopper cars and one 200-ton wrecking crane, at a total cost of $1,025,000.

The court order also authorized the trustees to issue and sell $6,400,000 of trustees' certificates, of which $3,000,000 will be used to refund an issue of certificates now outstanding and due January 1, 1937, and $3,400,000 will be used to cover additional cash required for the 1937 improvements and to operate the railroad to the extent not met by use of other funds.

LOCOMOTIVES

THE UTAH COPPER COMPANY has ordered 12 electric locomotives weighing 85 tons, from the General Electric Company.

THE ST. LOUIS SOUTHWESTERN has applied to the federal district court at St. Louis, Mo., for authority to spend $1,178,500 for new equipment and shop machinery. One petition asks permission to build five freight locomotives in the company's shops at Pine Bluff, Ark., at a cost of $550,000 and to purchase shop machinery for $128,500. The other seeks authority to purchase 10 all-steel air-conditioned passenger coaches for $500,000.

FREIGHT CARS

THE VIRGINIAN is asking for prices on the repair of 500 gondola cars of 116 tons' capacity.

THE WESTERN MARYLAND is inquiring for 100 to 500 box cars and 100 gondola cars, all of 50 tons capacity.

THE WESTERN PACIFIC is inquiring for 200 box cars of 50 tons capacity. This is in addition to its inquiry for 50 flat cars and 100 ballast cars reported in the *Railway Age* of October 24.

THE CHICAGO & EASTERN ILLINOIS has been authorized by the federal district court at Chicago to purchase 500 fifty-ton box cars from the General American Transportation Corporation.

AIR CONDITIONING

THE NASHVILLE, CHATTANOOGA & ST. LOUIS will spend $123,377 on an air-conditioning program, to be carried out this fall and the early part of next year. With the completion of this program, all cars used in main line service will be air-conditioned.

MOTOR VEHICLES

Baltimore & Ohio Orders 28 Streamlined Buses

The Baltimore & Ohio has placed with the White Motor Company, Cleveland, Ohio, an order for 28 streamlined buses, which, the announcement says, will be "the first completely air-conditioned coaches to be put in operation anywhere in the country," and which "have been styled to correspond with the railroad's streamlined trains by Otto Kuhler, consulting engineer for the Baltimore & Ohio." Twenty of the new buses will be placed in the B. & O.'s train-connection services in New York City and two others in similar services operating between Newark, N. J., and Elizabeth. The remaining six will be assigned to services operated by the West Virginia Transportation Company, B. & O. highway subsidiary.

THE CONNECTICUT COMPANY, an affiliate of the New York, New Haven & Hartford, has received delivery of seven 31 passenger motor coaches from the Twin Coach Company.

IRON & STEEL

THE CHICAGO & NORTH WESTERN has ordered 48,500 tons of rails from the Carnegie-Illinois Steel Company, the Inland Steel Company and the Bethlehem Steel Company. Fourteen thousand tons of fastenings were placed with six other manufacturers. Inquiry for this tonnage was reported in the *Railway Age* of October 31.

Construction

DES MOINES UNION.—A contract has been awarded to the Ross & White Company, Chicago, for furnishing and erecting an automatic electric skip bucket type engine coaler and an "N & W" type electric cinder handling plant adjacent to a new enginehouse of the Des Moines Union at Des Moines, Iowa.

NEW YORK, NEW HAVEN & HARTFORD.—This road has authorized ripraping work at Connecticut river bridge No. 34.65, at Saybrook, Conn., to cost about $28,000, and the installation of tracks, Middle dock, New Haven, Conn., to cost about $50,000.

NEW YORK CENTRAL.—Contracts have been let as follows: To Donald H. Walter & Company, Inc., New York, for the manufacture and delivery of lighting standards for Express Highway between West 72nd street and St. Clair Place, New York City; to I. M. Ludington's Sons, Inc., Rochester, N. Y., for the construction of substructure and superstructure, etc., for the elimination of grade crossing at Blossom road, Brighton station, Rochester; to Hoffman & Elias, Inc., New York, for furnishing and installing various lighting units, illuminated direction, signs, etc. for Express Highway from West 72nd street to West 82nd street, New York City.

PENNSYLVANIA.—The New York Public Service Commission has approved a low bid of $142,518 submitted by the Metzger Construction Corporation, Buffalo, N. Y., covering the elimination of the River road crossing of this road on the Scottsville-Rochester county highway in the Town of Chili, N. Y. The commission directed the railroad company to award the necessary contract and begin work as soon as practicable.

Supply Trade

W. W. Williams, general sales manager of the **Babcock & Wilcox Tube Company,** Beaver Falls, Pa., has been appointed general manager of the company and **T. F. Thornton,** sales manager of the Detroit office district, has been appointed general sales manager.

N. W. Storer, consulting railway engineer of the **Westinghouse Electric & Manufacturing Company** at East Pittsburgh, Pa., and internationally known for his contributions to railroad electrification projects, has retired after 45 years service with the company.

A suit filed by O. H. Stroh and brothers, seeking the appointment of a receiver for the real estate owned by the **St. Louis Car Company,** was dismissed by Circuit Judge Granville Hogan, at St. Louis, Mo., on October 30. The plaintiffs who claim to own $8,000 of the $1,560,000 in bonds issued by the company in 1925, contended they were entitled to immediate payment of the bonds and sought a prior lien on the company's properties on the grounds that they had not acceded to an extension of the bonds three years ago. Only about two per cent of the bondholders failed to accede to the extension of the bonds.

W. R. Spiller has been appointed chief engineer for the **White Motor Company,** Cleveland, Ohio, to succeed F. G. Alborn who recently resigned. Mr. Spiller came to the White Company as an apprentice from the University of Pennsylvania where he received a mechanical engineering degree in 1922. Shortly after he was assigned work in the company laboratory, became assistant research engineer, and was finally named truck engineer, which position he held until his new appointment. **Roger J. Soulen** has been appointed wholesale division manager succeeding Paul H. Castner, who has resigned to go to another company.

The **Electro-Motive Corporation,** La-Grange, Ill., a subsidiary of the **General Motors Corporation,** has awarded a contract to the **Austin Company,** Cleveland, Ohio for a 504-ft. extension to the main erection and machine-shop bays. This extension will complete the original plans for this part of the plant's development which has been held up pending operating experience in the initial unit which was finished in January, 1936, and provides approximately 84,000 sq. ft. of additional plant capacity. Work will be begun at once so as to make the additional plant space available for operation early in the Spring. The total expenditure contemplated for building and equipment is $750,000.

Ferdinand A. Keihn has resigned his position as manager—Contract and Specification department of the J. G. Brill Company, Philadelphia, Pa., to establish his own business in San Francisco, Cal., and has opened offices in the Rialto building in that city. He represents several manufacturers whose products are sold to

the railway industry. Mr. Keihn was associated with the International Motor Company (Mack Trucks) for five years as designing engineer and later as special sales representative. The following twelve years he was employed by the J. G. Brill Company successively as sales engineer, New England sales representative, and manager-Contract and Specification department.

Juluis Kindervater, former manager of the Alco plant of the American Locomotive Company at Richmond, Va., has been appointed resident manager of the Diesel Engine plant of the **American Locomotive Company** at Auburn, N. Y., and **H. W. Bliss** has been appointed manager of the Alco plant at Richmond, Va. Mr. Bliss formerly was superintendent of this same plant.

Juluis Kindervater is a native of Richmond, Va., where he attended public and high schools, and for four years Virginian Mechanics Institute Night School of Technology. He entered the Richmond Locomotive Works in January 1891, where he served four years as machinist apprentice, and then four years as draftsman apprentice. After three years in the drawing room on detail and elevation work he became general machine shop foreman, later maintenance engineer, which position he held until 1918 when he was transferred to the New York office as mechanical superintendent of the company. After three and one-half years in New York, Mr. Kindervater went back to Richmond as manager of the Alco plant, which position he held until his present appointment as resident manager of the Diesel Engine plant at Auburn.

H. W. Bliss was born in Providence, R. I., and after graduation from the public schools, took up a mechanical career with the Coleman Horse Shoe Nail Co., Pawtucket, R. I., where he remained for about 11 years. He then went with the Schoefield Manufacturing Co., builders of woolen machinery, engaged in sales and experimental work. Soon afterwards he became associated with the American Locomotive Company at Providence, builders of the Alco automobile and progressed until he became chief inspector, then served as a general foreman of the machine shop until the closing of the plant. He later re-entered the employ of the American Locomotive Co., at Richmond and was sent to the E. W. Bliss Company to supervise the manufacture of machinery for the cartridge case department later returning to Richmond as night foreman. He then went to Eddystone Munitions Company as general superintendent in the cartridge case department, and subsequently went to Kansas City, Mo., as superintendent of the Brass & Metal Company, makers of small arms munition. He then returned to the Richmond plant of the American Locomotive Company and was engaged on shell contracts and on completion of this work he became night foreman of locomotive building and later assistant superintendent. He was then transferred to the Alco Accessory plant as general foreman and then became superintendent, which position he held up to the present time.

David S. Youngholm, vice-president of the Westinghouse Lamp Company has been elected vice-president of the **Westinghouse Electric & Manufacturing Company.** He will have his headquarters

David S. Youngholm

in New York. Mr. Youngholm joined the Westinghouse organization 27 years ago. His first position was in the engineering department of the Westinghouse Lamp Company after which he entered the sales department. In 1924 he was placed in charge of production of the Westinghouse Lamp Company, with his headquarters at Bloomfield, N. J. A year later he became assistant manager of sales. In 1927 he was appointed assistant general superintendent and in 1930 became assistant to vice-president. He later was elected vice-president of the same organization, which position he held until his election as vice-president of the Westinghouse Electric & Manufacturing Company.

OBITUARY

H. Durant Cheever, chairman of the board of the Okonite Company, and president of the Okonite-Callender Cable Company, died of apoplexy in Paris, France, on October 23. He had been

H. Durant Cheever

chairman of the board of the Okonite Company for 10 years, and president for 20 years before that. Mr. Cheever had been living in Paris for the last five years. He was graduated from Harvard University in 1888.

Financial

ATCHISON, TOPEKA & SANTA FE.—*Bus Line Acquisition.*—Division 5 of the Interstate Commerce Commission in a report dated November 3 has authorized the acquisition by Santa Fe Trails Stages, Inc., of control of the Central Arizona Transportation Lines, Inc., and the Arizona-Utah Stages, Inc., by purchase of stock of the Central Arizona company for $75,000. The stock of the Santa Fe Trails Stages is owned by the Southern Kansas Stage Lines, 51 per cent of whose stock is owned by the General Improvement Company, and the commission's approval is on the express condition that appropriate steps will be taken to carry into effect intentions expressed by counsel for the Santa Fe subsequent to the hearing to transfer from the General Improvement Company to the railroad company the 49,720 shares of stock of the Southern Kansas to merge the properties and operating rights of the Arizona-Utah Stages, the Central Arizona and Santa Fe Trails Stages into the Southern Kansas Stage Lines Company, and dissolve the separate companies.

CENTRAL WEST VIRGINIA & SOUTHERN. —*Abandonment.* — The Interstate Commerce Commission has authorized this company to abandon as to interstate and foreign commerce its entire line between Hendricks, W. Va., and Armentrout, 29.5 miles.

FORT WORTH BELT. — *Interlocking Director Application Withdrown.*—George A. Tomlinson, whose application for authority to serve as a director of this company while serving also as a director of other Van Sweringen companies was made the occasion for an investigation by the Interstate Commerce Commission earlier in the year into the affairs of the Midamerica Corporation, has withdrawn the application and the commission has dismissed the case without a report. Mr. Tomlinson was advised by Oliver E Sweet, director of the commission's Bureau of Finance, that Division 4 was unwilling to approve the application.

LAKE ERIE, FRANKLIN & CLARION.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a branch extending from Strattonville, Pa., to the mouth of Millcreek, 3.2 miles, and also the last mile of its so-called Reidsburg branch.

LEHIGH VALLEY.—*Repayment to R. F. C.*—This company paid on maturity November 1, notes to the Reconstruction Finance Corporation totaling $3,000,000, reducing its indebtedness to that agency to $5,000,000 (the road having also paid an additional $500,000 to the R. F. C., to apply on later maturities). On this payment the Interstate Commerce Commission authorized the release of $9,434,000 face amount of securities on deposit with the R. F. C. as collateral.

MISSOURI PACIFIC TRANSPORTATION COMPANY. — *Acquisition.* — This company has applied to the Interstate Commerce

Commission for authority to acquire three units of equipment and the certificate of the White Line Stage Line, operating between Lexington, Mo., and Kansas City.

MISSOURI PACIFIC. — *Compensation of Trustee.*—Upon application by Guy A. Thompson, trustee for this company, the Interstate Commerce Commission has authorized his maximum compensation to be increased from $25,000 to $30,000 per annum.

NASHVILLE, CHATTANOOGA & ST. LOUIS. —*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon a branch line from Rock Spur, Tenn., to Ravenscroft, 12.5 miles.

PENNSYLVANIA.—*Stock.*—The Philadelphia, Baltimore & Washington has applied to the Interstate Commerce Commission for authority to issue $10,000,000 of capital stock to be delivered to the Pennsylvania in reimbursement for expenditures for capital improvements.

SOUTHERN PACIFIC.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $9,150,000 of 2¼ per cent equipment trust certificates, which it is proposed to sell to Halsey, Stuart & Co., at 99.527.

UNION RAILROAD.—*Merger.*—This company, the Monongahela & Southern, which it controls through stock ownership, and the St. Clair Terminal have applied to the Interstate Commerce Commission for authority for a merger of the three properties into the Union Railroad.

UNION TRANSFER COMPANY.—*Acquisition by Railroads.*—Examiner Robert R. Hendon, of the section of finance of the Interstate Commerce Commission's Bureau of Motor Carriers, has recommended in a proposed report that the commission approve and authorize the acquisition by the Union Pacific, the Chicago, Burlington & Quincy, and the Chicago & North Western of control of the Union Transfer Company, which operates 73 motor vehicles on routes extending east, north, and west of Omaha, Neb., by purchase of its capital stock for $150,000. Certain protestants had contended that the motor carrier act did not authorize acquisition of a motor carrier by several railroads but the examiner says that the phrase "a carrier by railroad" as used in the law must be construed to be definitive of a class rather than a restriction as to the number of carriers.

"The proposal herein appears to be the initial step in a program of applicants to acquire joint control of a number of existing trucking operations centering about Omaha," the examiner says. "The program apparently contemplates, that, as these trucking operations are developed and extended into the territories of other rail carriers, such other rail carriers are to be given the privilege of participating in the project to the extent their respective territories are involved and upon a basis to be later and mutually agreed upon between the applicants and such other railroads.

"It is planned to coordinate rail-truck service so that Union Transfer will serve not only as an independent truck line, but will perform a service for applicants in accomplishing a part of the haul on less-than-carload freight, where it will be more economical and improve the service. Trucks will complete or originate, as the case may be, the haul on merchandise destined to rail main line local points, and thus avoid the stopping of freight trains at small stations to unload and pick up minor less-than-carload shipments. Such merchandise will be handled by trucks to or from the nearest breakbulk point on the railroad. The movement of less-than-carload freight will be made in rail setout cars to distributing points, from which delivery will be made to intermediate stations by line haul trucks. Likewise, freight from intermediate stations will be picked up and moved by truck to key stations for concentration, from whence it will be transported by train to destination or to other key stations, and then to destination by truck or by rail. Union Transfer will also complete or originate the haul, as the case may be, on branch lines where rail freight service is infrequent, and will be used for performing lateral or feeder service, and as a substitute for rail service on unprofitable branch lines. It will limit its operations in connection with applicants' rail service to stations on their respective lines and will not invade the territory of other railroads not participating in this enterprise.

"Traffic officers of applicants expressed the opinion that the rail-truck plan of operation can be made effective by use of tariff publication under tariff regulations of the Commission, through supplements to applicants' present rail tariffs, showing the Union Transfer as a concurring carrier in connection with less-than-carload shipments. The concurrence will permit substitution of truck for rail service of applicants, between stations on their respective lines, covering all or any part of the haul on any shipment moving on rates under said tariffs and will not affect the service or divisions of other rail carriers concurring in the tariff. Such concurrence contemplates participation of Union Transfer on railroad billing and, only as an agency for performing truck service, as a substitute for applicants' rail service."

WHEELING & LAKE ERIE.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority to sell $750,000 of 2¼ per cent equipment trust certificates.

Average Prices of Stocks and Bonds

	Nov. 4	Last week	Last year
Average price of 20 representative railway stocks..	59.56	58.87	36.50
Average price of 20 representative railway bonds..	83.20	83.54	72.30

Dividends Declared

Albany & Vermont.—$1.35, payable November 16 to holders of record October 31.

Boston & Albany.—2.25, payable December 31 to holders of record November 30.

Detroit, Toledo & Ironton.—$3.00, increased, payable November 20.

Railway Officers

EXECUTIVE

J. B. Thom, chief clerk to the traffic manager of the foreign freight department of the Canadian National, has been appointed assistant to vice-president in charge of traffic, with headquarters at Montreal, Que.

George M. Crowson, assistant to the senior vice-president of the Illinois Central, with headquarters at Chicago, has been appointed assistant to the president, in which capacity he will remain in charge of public relations work.

FINANCIAL, LEGAL AND ACCOUNTING

S. L. Porter, assistant general auditor of the Chicago, Burlington & Quincy, has been promoted to general auditor, with headquarters as before at Chicago, to succeed **H. D. Foster,** who has retired after 54 years service with the Burlington. **A. W. Lavidge,** auditor of freight accounts, has been promoted to assistant general auditor, to succeed Mr. Porter, and has been replaced as auditor of freight accounts by J. F. Blair. These appointments were effective on November 1.

OPERATING

W. H. Schoonover has been appointed assistant superintendent of freight transportation of the Central region of the Pennsylvania.

R. E. Edens has been appointed superintendent of the Ogden Union Railway & Depot Company, Ogden, Utah, to succeed **F. C. Smith,** who has retired, effective November 1.

C. P. Fisher, trainmaster on the Pennsylvania at Chicago, has been promoted to superintendent of the Chicago Terminal division, to succeed **F. R. Rex,** who has been transferred to the St. Louis division, with headquarters at Terre Haute, Ind., succeeding **W. W. Patchell.**

W. W. Patchell, superintendent of the St. Louis division of the Pennsylvania, with headquarters at Terre Haute, Ind., has been transferred in the same capacity to the Baltimore division, with headquarters at Baltimore, Md., succeeding **G. M. Smith,** whose retirement was noted in the *Railway Age* of October 31.

W. C. Baker, superintendent of the St. Louis division of the Baltimore & Ohio, with headquarters at Cincinnati, Ohio, has been transferred to the Akron-Chicago division of the Northwest district, with headquarters at Akron, Ohio, succeeding **T. K. Faherty,** who has accepted an appointment as a member of the First division of the National Railroad Adjustment Board. Co-incident with Mr. Baker's appointment, which was ef-

fective on November 1, a rearrangement of the St. Louis division was effected, in which the Ohio subdivision of that division, extending from Parkersburg, W. Va., to Cincinnati, was consolidated with the Cincinnati Terminal division to form the Ohio division. **T. C. Smith,** superintendent of the Cincinnati Terminal division, has been appointed superintendent of the new Ohio division, with headquarters at Cincinnati. **W. F. Booth,** assistant superintendent of the Pittsburgh division, has been appointed superintendent of the New St. Louis division, which embraces the territory west of Cincinnati, exclusive of the Cincinnati terminals. **R. E. Chamberlain,** assistant superintendent of the former St. Louis division, has been appointed superintendent of the Ohio division, with headquarters at Chillicothe, Ohio.

O. L. Gray, trainmaster on the Atchison, Topeka & Santa Fe at Fresno, Cal., has been appointed acting superintendent of the Albuquerque division, with headquarters at Winslow, Ariz., to succeed **V. H. Wilson,** who has been appointed acting superintendent of the Los Angeles division, with headquarters at San Bernardino, Cal., to replace **C. G. Fluhr,** who has been granted a leave of absence because of illness.

James W. Mode, assistant superintendent on the Fort Worth & Denver City, who has been promoted to superintendent, as reported in the *Railway Age* of October 17, has been identified with the F. W. & D. C. continuously for 35 years. He was born on June 30, 1882, in Wise county, Tex., and entered railway service with the F. W. & D. C. in December, 1901, as a brakeman at Wichita Falls, Tex. Four years later he was advanced

James W. Mode

to conductor, which position he held until August, 1919, when he was further advanced to trainmaster of the Wichita Falls division. In January, 1923, Mr. Mode was promoted to assistant superintendent of the Amarillo division, and on May 1, 1926, he was made superintendent of that division. On September 1, 1932, when the Wichita Falls and Amarillo divisions were consolidated Mr. Mode, being the junior superintendent, was appointed assistant superintendent of the consolidated division. On November 9, 1935, he was appointed acting superintendent of the enlarged division, which position he held until his recent appointment as superintendent of the Amarillo division, that division having been restored to the status that it occupied prior to the consolidation which was carried out in 1932.

ENGINEERING AND SIGNALING

D. F. Carter has been appointed assistant electrical engineer of the Chicago, Burlington & Quincy, with headquarters at Chicago, to succeed **T. W. Wigton,** deceased.

T. J. Skillman, chief engineer of the Pennsylvania System, has been appointed chief engineer-consultant. **W. D. Wiggins,** acting chief engineer System, has been appointed chief engineer System, both with headquarters as before at Philadelphia, Pa. **W. B. Wood,** acting chief engineer of the Central Region, with headquarters at Pittsburgh, Pa., has been appointed chief engineer of the Central Region, succeeding Mr. Wiggins.

TRAFFIC

Russell G. East, agricultural agent for the Pennsylvania, with headquarters at Richmond, Ind., has been promoted to general agricultural agent of the Pennsylvania System, with the same headquarters.

Harry Sengstacken, city freight agent for the Chicago, Milwaukee, St. Paul & Pacific at New York City, has been appointed general agent, with headquarters at Boston, Mass., effective November 1, to succeed **F. D. Dodge,** deceased.

J. H. Gregory, commercial agent on the Chicago, Burlington & Quincy at Kansas City, Mo., has been promoted to general agent, with headquarters at Salt Lake City, Utah, to succeed **R. F. Neslen,** who has retired after 48 years of service with this company.

J. J. King, assistant general freight agent of the Akron, Canton & Youngstown, with headquarters at Akron, Ohio, has been promoted to general freight agent, with the same headquarters, to succeed **A. G. Anderson,** who has been assigned to other duties at his own request. **L. H. Doty,** general agent at Akron, has been appointed assistant general freight agent in charge of solicitation, to succeed Mr. King.

Walter J. Grant has been appointed general merchandise agent of the Boston & Maine, with headquarters at Boston, Mass., effective November 15, heading a new department which will specialize in service to shippers and receivers of l.c.l. freight. Mr. Grant will also supervise the railroad's handling of shipments of carload forwarding companies and the Railway Express Agency. Mr. Grant was born in Boston, Mass., and attended the public schools of that city and Harvard Business School. He entered railroad service with the New York, New Haven & Hartford in 1917 and, after service in several departments of the railroad, resigned in December, 1928, to enter the service of the Acme Fast Freight, Inc., and

Walter J. Grant

its affiliates. He subsequently became manager of the Acme Boston office, in which position he served until six months ago, when he was promoted to assistant to the vice-president at New York. He resigned from the latter position to take up his new duties with the Boston & Maine.

MECHANICAL

F. R. Hosack, master mechanic of the Gulf Coast Lines (part of the Missouri Pacific Lines), with headquarters at Kingsville, Tex., has been appointed acting mechanical superintendent of the Missouri Pacific, with headquarters at St. Louis, Mo., to succeed **W. H. McAmis,** who has been granted a leave of absence. Mr. Hosack's appointment became effective on November 1.

OBITUARY

Leslie G. Parsons, general agent at Detroit for the Louisville & Nashville, died on November 2 at the age of 67 years after an illness of several weeks.

Col. Moorhead C. Kennedy, former vice-president of the Pennsylvania, died on November 3 at his home in Chambersburg, Pa., at the age of 74 years. Col. Kennedy was born in Chambersburg and received his higher education at Princeton University, receiving the degree of civil engineer in 1884. He began his railroad career as assistant to the president of the Cumberland Valley (now part of the Pennsylvania) in 1889. After serving also as vice-president, and vice-president and general superintendent, he was elected president on January 1, 1913. In 1919 when the Cumberland Valley was acquired by the Pennsylvania Col. Kennedy became resident vice-president in the Cumberland Valley district. From 1920 until his retirement on April 1, 1932, he was vice-president at Philadelphia with jurisdiction over the purchasing department, stores and insurance and from 1920 to 1924 he was in charge of the real estate department also. In 1926, Col. Kennedy was elected to serve as a director, in addition to his vice-presidential duties.

Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1936

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr. & retir. 1936	1935	Before depr. & ret.
Akron, Canton & Youngstown	Sept.	171	$178,492	$33	$189,466	$30,802	$18,001	$8,281	$51,111	$116,910	61.7	$72,556	$59,199	$43,524	$29,456	$47,795
	9 mos.	171	1,554,086	338	1,652,036	263,581	147,675	75,628	470,859	1,039,349	62.9	612,687	501,841	338,196	267,170	378,226
Alton	Sept.	956	1,064,264	165,107	1,407,666	342,342	184,829	47,379	485,956	1,122,915	79.8	284,751	200,035	24,940	—51,855	54,123
	9 mos.	956	8,821,343	1,525,478	11,871,307	2,025,6[illegible]	1,889,258	433,269	4,546,728	9,419,050	79.3	2,452,257	1,685,908	110,770	—785,231	369,443
Atchison, Topeka & Santa Fe System	Sept.	13,227	10,791,320	1,334,799	13,247,908	2,341,406	2,978,882	391,632	4,534,579	10,674,028	80.6	2,573,880	1,411,785	1,403,216	1,274,752	2,307,949
	9 mos.	13,231	91,016,028	11,785,317	112,242,012	17,986,812	26,245,963	3,786,656	39,704,116	91,580,444	81.6	20,661,568	10,555,642	10,889,658	10,052,452	19,359,059
Atlanta & West Point	Sept.	93	108,824	23,895	160,655	17,309	28,695	8,815	59,165	124,998	77.8	35,657	28,727	12,309	5,593	21,378
	9 mos.	93	907,899	205,087	1,312,074	167,710	264,419	73,639	535,915	1,130,442	86.2	181,632	118,753	—14,530	—61,480	67,614
Western of Alabama	Sept.	133	98,759	24,685	144,268	17,341	30,932	7,575	53,192	118,324	82.0	25,944	17,203	16,379	3,607	29,502
	9 mos.	133	800,376	207,386	1,144,388	175,279	286,043	63,235	460,405	1,060,117	92.6	84,271	6,260	18,476	—83,572	136,170
Atlanta, Birmingham & Coast	Sept.	639	243,070	10,879	283,141	40,878	50,043	23,813	99,414	238,262	84.1	44,879	31,745	22,660	—2,550	32,091
	9 mos.	639	2,074,480	161,110	2,511,350	385,745	450,129	198,993	951,013	2,205,030	87.8	306,320	181,141	50,460	—72,174	152,411
Atlantic Coast Line	Sept.	5,105	2,362,488	385,568	3,193,029	326,909	698,876	129,363	1,242,775	2,541,380	79.6	651,649	376,649	436,865	212,880	610,946
	9 mos.	5,132	23,119,408	5,372,306	32,305,896	3,517,326	6,172,217	1,143,511	12,684,206	25,016,595	77.4	7,289,301	3,764,301	3,010,411	1,631,486	4,601,409
Charleston & Western Carolina	Sept.	342	164,329	1,381	170,226	27,278	27,867	7,147	56,437	124,074	72.9	46,152	21,652	21,323	16,831	27,537
	9 mos.	342	1,596,669	11,776	1,650,882	232,668	254,679	58,532	534,741	1,126,656	68.2	524,226	347,726	324,778	234,249	381,156
Baltimore & Ohio	Sept.	6,486	13,073,975	1,001,318	14,934,370	1,501,617	3,046,544	400,287	4,630,403	10,255,808	68.7	4,678,562	3,837,338	3,403,002	2,508,666	4,017,036
	9 mos.	6,486	107,764,717	8,338,078	123,297,542	11,113,399	28,412,071	3,500,687	41,857,397	91,004,943	73.8	32,292,599	24,769,035	21,146,578	17,253,083	26,686,475
Staten Island Rapid Transit	Sept.	23	53,488	74,891	136,862	14,445	21,600	1,778	80,652	130,594	95.4	6,268	—15,532	—29,632	—35,389	—22,214
	9 mos.	23	422,349	707,051	1,202,001	121,374	189,971	16,682	762,379	1,201,610	100.0	391	—189,959	—322,284	—390,970	—255,545
Bangor & Aroostook	Sept.	603	356,823	15,282	391,572	82,819	80,586	5,129	104,042	296,286	75.7	95,286	52,700	63,172	—18,336	85,595
	9 mos.	603	3,964,512	166,936	4,312,096	849,146	777,978	48,175	1,149,751	3,039,013	70.5	1,273,083	843,370	843,960	1,184,590	1,044,349
Bessemer & Lake Erie	Sept.	225	1,982,888	854	1,999,677	109,274	286,554	11,212	243,822	686,166	34.3	1,313,511	1,300,245	1,317,039	403,978	1,391,229
	9 mos.	225	10,942,762	29,302	11,090,446	1,066,083	2,478,511	105,142	1,708,425	5,691,702	51.3	5,398,744	4,388,461	4,728,647	2,165,932	5,246,939
Boston & Maine	Sept.	1,988	2,771,493	611,475	3,942,834	489,152	627,714	66,093	1,459,726	2,826,804	71.7	1,116,030	831,564	661,643	499,767	796,763
	9 mos.	1,993	24,063,292	5,167,752	33,773,041	5,528,494	5,545,296	599,888	13,851,498	27,212,151	80.6	6,560,890	4,067,079	2,357,733	4,322,976	3,586,752
Brooklyn East. Dist. Term	Sept.	12.41	113,610	.....	116,138	11,320	10,500	601	31,334	59,946	51.6	56,192	46,915	46,915	41,917	.....
	9 mos.	12.41	949,220	.....	970,136	56,785	90,199	4,497	268,047	476,181	49.1	493,955	417,993	418,960	298,642	.....
Burlington, Rock Island	Sept.	255	63,109	5,445	74,018	29,345	12,026	4,989	38,910	92,126	124.5	—18,108	—25,966	—35,898	—23,576	—33,933
	9 mos.	255	497,116	47,811	591,336	155,994	109,350	35,763	334,562	701,239	118.6	—109,903	—174,954	—252,390	—287,243	—233,600
Cambria & Indiana	Sept.	37	119,780	.....	119,962	8,883	37,799	374	12,343	65,816	54.86	54,146	17,278	86,151	65,405	101,672
	9 mos.	37	917,528	.....	918,994	77,735	510,159	3,408	111,742	755,350	82.19	163,644	—52,412	569,757	654,028	711,070
Canadian Pacific Lines in Maine	Sept.	233	94,897	16,598	125,538	34,394	28,702	9,592	53,902	134,097	106.8	—8,559	—18,004	—29,666	—44,367	—27,566
	9 mos.	233	1,381,866	138,026	1,634,266	358,101	363,709	86,985	651,868	1,527,802	93.5	106,464	24,991	—149,347	—150,154	—130,733
Canadian Pacific Lines in Vermont	Sept.	85	67,488	9,917	88,668	19,891	18,245	4,264	52,354	100,631	113.5	—11,963	—19,137	—37,581	—43,654	—37,581
	9 mos.	85	570,340	78,675	752,420	178,729	230,621	38,739	510,002	1,009,131	134.1	—256,711	—320,742	—487,416	—379,799	—487,416
Central of Georgia	Sept.	1,926	1,111,018	121,209	1,358,683	162,919	273,761	53,577	519,126	1,089,415	80.2	269,268	166,023	142,191	215,594	206,240
	9 mos.	1,926	9,276,387	1,054,999	11,591,795	1,461,332	2,472,107	473,289	4,701,425	9,845,349	84.9	1,746,446	856,651	651,580	560,704	1,228,885
Central of New Jersey	Sept.	681	2,064,662	437,482	2,686,552	212,387	475,717	56,526	1,043,262	1,902,349	70.8	784,203	270,471	150,336	113,464	276,213
	9 mos.	681	18,264,130	3,535,520	23,280,685	1,818,630	4,423,340	438,175	9,860,891	17,582,198	75.5	5,698,487	2,244,633	1,015,762	2,048,804	2,160,406
Central Vermont	Sept.	453	390,897	41,025	477,148	94,744	99,798	15,299	238,663	471,239	98.8	5,909	—15,708	—83,329	31,938	—57,966
	9 mos.	453	3,638,566	303,283	4,303,939	827,593	889,921	131,313	2,138,014	4,193,304	97.4	110,635	—63,404	—232,983	268,785	7,900
Chesapeake & Ohio	Sept.	3,106	10,900,722	294,338	11,630,398	1,005,852	1,884,944	197,817	2,425,442	5,850,487	50.3	5,779,911	4,725,862	4,772,453	3,510,356	5,477,272
	9 mos.	3,106	92,081,651	2,505,901	98,065,084	9,269,965	17,439,734	1,720,366	21,079,431	52,387,881	53.4	45,677,203	35,970,373	36,219,032	27,034,366	42,536,545
Chicago & Eastern Illinois	Sept.	931	989,589	136,233	1,281,135	155,621	220,614	54,878	456,182	949,045	74.1	332,090	252,090	109,418	29,673	158,034
	9 mos.	931	9,116,800	1,000,045	11,476,772	1,360,890	1,992,863	497,884	4,355,827	8,772,291	76.4	2,704,481	2,024,481	741,843	177,893	1,184,414
Chicago & Illinois Midland	Sept.	131	299,817	1,159	309,076	24,070	50,627	16,213	67,945	175,226	56.7	133,850	102,502	103,393	44,208	117,002
	9 mos.	131	2,522,071	11,480	2,604,527	242,997	475,758	151,138	654,474	1,679,164	64.5	925,363	754,955	765,324	635,050	887,894
Chicago & North Western	Sept.	8,355	6,609,047	895,208	8,380,435	1,202,172	1,591,382	169,319	2,945,256	6,255,828	74.6	2,124,607	1,540,021	1,246,506	859,941	1,655,224
	9 mos.	8,355	52,542,847	8,053,765	67,568,170	12,127,628	15,437,018	1,570,348	26,439,283	58,622,243	86.8	8,945,927	3,382,944	1,408,150	1,132,321	5,111,744
Chicago, Burlington & Quincy	Sept.	9,012	7,017,615	724,797	8,625,848	1,181,517	1,342,197	208,308	2,889,432	5,985,402	69.4	2,640,446	1,939,267	1,427,150	1,361,629	1,808,596
	9 mos.	9,013	57,417,099	6,063,704	70,649,382	10,033,161	12,480,595	2,094,901	25,281,081	53,085,386	75.1	17,563,996	11,564,997	7,952,350	3,866,967	11,390,929
Chicago Great Western	Sept.	1,512	1,515,883	51,702	1,681,203	219,960	182,961	56,580	562,332	1,074,176	63.9	607,027	531,227	302,228	232,314	345,859
	9 mos.	1,512	12,104,334	422,913	13,425,040	1,981,299	1,818,166	481,171	5,037,439	9,788,435	72.9	3,636,605	2,950,172	1,220,884	321,826	1,597,619
Chicago, Indianapolis & Louisville	Sept.	572	738,147	49,013	879,989	91,347	193,327	27,583	325,914	671,898	76.4	208,091	161,156	62,845	46,321	101,730
	9 mos.	572	6,263,446	445,613	7,532,886	720,231	1,801,303	254,887	2,946,809	6,035,850	80.1	1,497,036	1,134,552	213,367	—79,491	581,518

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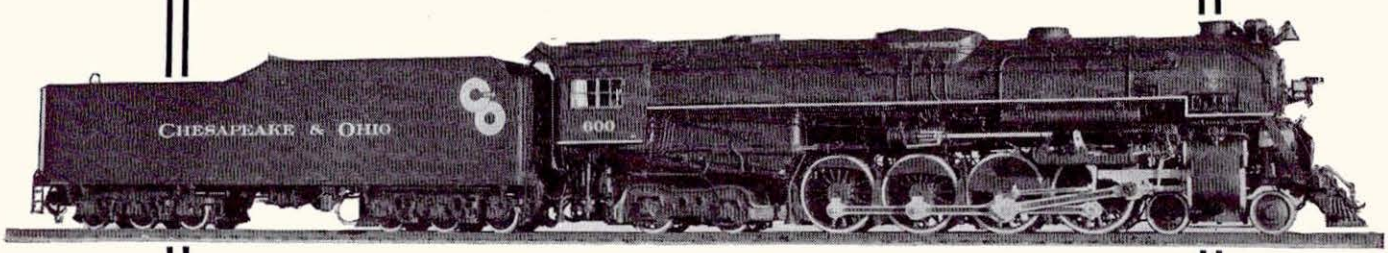
Horsepower Capacity is Hauling Capacity AT HIGH SPEEDS

MODERN power, only, can provide the speed and hauling capacity necessary to meet the demands of the traveler and shipper of today. » » » The high horsepower capacity of modern locomotives is essential to maintain the present standard of operation.



LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

LIMA
LOCOMOTIVE WORKS
INCORPORATED

Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr.& retir. 1936	After depr.& retir. 1935	Before depr.& ret.
Chicago, Mil., St. Paul & Pac.	Sept.	11,128	$8,228,615	$697,271	$9,800,470	$2,107,185	$1,614,020	$232,977	$3,360,148	$7,638,181	77.9	$2,162,289	$1,484,289	$877,912	$806,938	$1,322,183
	9 mos.	11,127	67,160,006	5,501,944	79,981,772	14,586,812	14,628,547	1,915,176	30,049,424	64,158,189	80.2	15,823,583	9,665,583	4,954,010	741,945	8,978,442
Chicago, Rock Island & Pacific	Sept.	7,576	4,935,420	623,170	6,190,988	1,094,690	1,287,002	204,771	2,464,972	5,409,553	87.4	781,435	324,057	41,927	274,048	393,168
	9 mos.	7,575	43,976,817	5,148,296	54,501,551	7,632,102	12,969,712	1,792,513	22,859,647	48,742,455	89.4	5,759,096	1,603,607	—1,051,121	—1,277,609	2,162,198
Chicago, Rock Island & Gulf	Sept.	626	232,672	29,433	342,385	56,895	37,678	16,391	129,425	265,921	77.7	76,464	53,843	—2,993	3,227	882
	9 mos.	626	2,271,018	249,857	3,215,645	499,677	316,454	145,211	1,148,324	2,344,655	72.9	870,990	671,084	187,595	1,764	223,803
Chicago, St. Paul, Minn. & Omaha	Sept.	1,648	1,369,842	153,721	1,633,822	217,000	275,559	33,546	694,940	1,298,407	79.5	335,415	233,193	83,385	170,934	132,647
	9 mos.	1,648	11,452,977	1,222,338	13,630,803	1,625,168	2,345,811	316,350	6,337,833	11,325,606	83.1	2,305,197	1,389,156	337,804	—171,405	784,746
Clinchfield Railroad	Sept.	309	494,168	4,587	504,037	35,510	130,775	17,997	93,172	291,060	57.7	212,977	164,433	213,057	180,643	255,667
	9 mos.	309	4,407,587	40,656	4,496,945	345,297	1,058,523	157,291	881,420	2,571,484	57.2	1,925,461	1,503,992	1,853,489	1,328,093	2,243,507
Colorado & Southern	Sept.	956	610,722	48,761	714,340	86,036	99,854	21,484	265,708	508,106	71.1	206,234	140,461	106,163	52,882	137,530
	9 mos.	999	4,469,631	312,924	5,260,427	667,508	997,053	126,060	2,108,604	4,212,817	80.1	1,047,610	474,166	261,297	—116,696	545,469
Ft. Worth & Denver City	Sept.	902	459,192	59,901	518,311	51,922	77,105	25,611	161,699	350,867	67.7	167,444	131,780	92,223	116,675	109,501
	9 mos.	902	3,859,394	421,101	4,286,540	402,503	748,610	169,457	1,373,098	3,013,935	70.3	1,272,605	963,238	678,498	312,522	836,668
Columbus & Greenville	Sept.	167	107,565	8,714	124,078	16,836	16,403	4,546	40,810	88,729	71.5	35,349	31,202	25,139	15,914	27,921
	9 mos.	167	731,282	58,693	839,897	152,970	136,631	34,754	320,384	735,033	87.5	104,864	72,552	56,327	—8,246	81,444
Delaware & Hudson	Sept.	831	1,937,025	127,549	2,155,460	283,461	490,823	45,083	729,319	1,679,165	77.9	476,295	332,403	322,676	180,027	412,821
	9 mos.	831	16,719,935	905,975	18,416,061	2,493,420	4,485,437	410,694	6,836,449	15,420,838	83.7	2,995,223	1,774,638	1,831,204	1,167,960	2,655,852
Delaware, Lackawanna & Western	Sept.	984	2,957,809	588,720	4,071,763	347,622	808,712	108,376	1,737,517	3,150,099	77.4	921,664	586,664	571,730	542,235	793,118
	9 mos.	987	27,123,882	5,217,224	36,527,237	3,480,667	6,947,929	1,033,314	16,446,180	29,512,226	80.8	7,015,011	4,002,011	3,853,756	2,000,836	5,855,264
Denver & Rio Grande Western	Sept.	2,584	2,388,323	158,634	2,663,056	418,857	540,864	52,514	868,441	1,926,661	72.3	736,395	557,031	441,370	447,795	537,084
	9 mos.	2,584	15,912,421	1,160,401	17,962,989	3,137,711	4,991,618	475,368	6,177,986	15,397,917	85.7	2,565,072	878,784	275,968	716,590	1,141,198
Denver & Salt Lake	Sept.	232	278,519	6,411	296,140	49,579	40,980	2,372	67,864	158,559	53.5	137,581	115,959	154,920	175,227	169,129
	9 mos.	232	1,730,304	69,619	1,880,858	338,980	563,163	20,842	503,269	1,450,573	77.1	430,285	247,520	604,606	812,321	659,949
Detroit & Mackinac	Sept.	242	68,658	3,106	79,262	8,397	14,454	921	24,936	52,396	66.1	26,866	24,259	19,723	21,771	22,587
	9 mos.	242	461,296	27,516	544,911	94,720	102,717	8,375	207,202	443,619	81.4	101,292	87,898	57,935	22,760	84,217
Detroit & Toledo Shore Line	Sept.	50	253,255	.....	254,727	24,679	26,101	7,670	61,253	127,451	50.0	127,276	102,884	57,649	84,382	63,208
	9 mos.	50	2,798,644	.....	2,812,010	251,903	230,618	70,166	680,892	1,300,382	46.2	1,511,628	1,239,550	752,475	699,838	802,508
Detroit, Toledo & Ironton	Sept.	472	501,188	249	525,582	69,036	92,735	10,542	120,352	318,689	60.6	206,893	169,322	140,532	179,211	161,860
	9 mos.	472	5,635,088	2,247	5,788,295	568,596	748,361	95,245	1,232,514	2,870,058	49.6	2,918,237	2,354,255	2,024,927	2,441,649	2,219,905
Duluth, Missabe & Northern	Sept.	556	2,772,783	3,250	3,201,930	185,807	220,189	4,126	393,485	845,458	26.4	2,356,472	2,383,932	2,379,530	954,732	2,454,202
	9 mos.	558	12,579,806	23,727	14,433,891	1,336,085	1,908,080	34,495	2,314,319	5,996,307	41.5	8,437,584	7,115,863	7,106,693	3,922,461	7,780,516
Duluth, Winnipeg & Pacific	Sept.	178	104,252	1,955	110,074	19,366	15,801	1,748	41,220	83,260	75.6	26,814	19,130	8,455	—16,300	11,458
	9 mos.	178	965,107	18,861	1,011,747	220,155	159,941	16,154	403,954	839,981	83.0	171,766	102,643	—38,114	—138,990	—9,850
Elgin, Joliet & Eastern	Sept.	434	1,285,230	12	1,562,299	143,615	334,805	14,360	552,726	1,091,613	69.9	470,686	438,255	384,784	172,960	459,059
	9 mos.	434	11,631,918	46	13,578,784	1,265,821	2,916,072	124,690	4,830,569	9,546,487	70.3	4,032,297	3,013,280	2,720,174	1,917,531	3,393,738
Erie	Sept.	2,297	6,311,110	469,593	7,343,770	682,676	1,331,153	173,186	2,499,872	4,981,884	67.8	2,361,886	1,833,301	1,466,448	1,392,755	1,790,561
	9 mos.	2,297	53,060,118	4,013,738	61,764,507	5,350,071	11,572,003	1,526,293	22,398,757	43,568,225	70.5	18,196,282	14,014,331	11,527,551	8,593,228	14,441,900
New Jersey & New York	Sept.	45	13,534	44,704	60,368	5,321	15,494	479	45,632	68,647	113.7	—8,279	—13,529	—28,922	—29,879	—28,911
	9 mos.	45	141,116	426,496	585,366	46,111	137,469	5,563	435,229	640,670	109.4	—55,304	—99,334	—243,741	—321,153	—243,642
New York, Susque. & Western	Sept.	215	235,325	23,410	271,033	23,255	33,189	5,002	113,816	188,484	69.5	82,549	57,506	29,063	21,239	34,578
	9 mos.	215	2,253,823	217,655	2,582,756	234,674	319,989	43,075	1,121,067	1,840,418	71.3	742,338	526,922	270,385	268,419	321,736
Florida East Coast	Sept.	712	294,446	87,218	430,451	94,124	137,414	18,701	164,021	460,090	106.9	—29,639	—108,545	—130,481	—195,186	—91,719
	9 mos.	712	3,931,237	1,826,123	6,458,392	903,962	1,185,178	198,284	2,090,118	4,860,463	75.3	1,597,929	890,816	531,576	—133,369	1,029,121
Fort Smith & Western	Sept.	249	74,274	945	78,160	16,068	8,116	6,400	23,089	56,571	72.4	21,589	20,589	11,829	—93	12,395
	9 mos.	249	520,748	9,110	559,099	139,532	76,718	50,372	182,786	477,989	85.5	81,110	68,329	5,006	—64,626	10,116
Georgia Railroad	Sept.	329	292,312	15,329	334,096	25,603	61,590	18,470	130,467	249,699	74.7	84,397	78,032	85,515	70,353	96,623
	9 mos.	329	2,357,137	130,146	2,698,473	260,846	546,069	157,095	1,144,772	2,231,587	82.7	466,886	409,956	485,271	413,884	587,454
Georgia & Florida	Sept.	408	90,310	3,526	98,074	24,381	17,357	8,704	37,556	93,732	95.6	4,342	—2,880	—5,433	—2,773	—156
	9 mos.	408	826,547	23,648	885,503	212,607	154,414	75,811	324,119	818,082	92.4	67,421	6,602	—8,882	25,918	38,319
Grand Trunk Western	Sept.	1,032	1,389,844	84,769	1,618,392	311,747	351,055	34,178	700,126	1,471,655	90.9	146,737	25,818	—158,662	244,152	—69,866
	9 mos.	1,032	15,507,583	688,177	17,451,493	2,259,004	3,297,762	317,170	6,851,941	13,493,045	77.3	3,958,448	2,977,259	1,956,516	1,506,880	2,798,743
Canadian Nat'l Lines in New Eng.	Sept.	172	108,274	7,938	125,422	38,845	19,506	2,344	65,651	135,000	110.0	—9,578	—25,050	—51,923	—43,891	—48,963
	9 mos.	172	859,427	59,459	1,002,871	358,842	181,349	21,896	539,981	1,183,888	118.0	—181,017	—314,575	—553,941	—546,459	—527,144
Great Northern	Sept.	8,155	8,614,198	419,077	9,815,615	848,477	1,215,425	174,712	2,717,792	5,254,855	53.5	4,560,760	3,847,856	3,594,468	4,600,859	3,896,879
	9 mos.	8,212	55,959,248	3,766,758	65,235,833	6,627,568	10,469,298	1,613,428	21,110,504	42,338,285	64.9	22,897,548	17,104,220	16,244,222	14,966,243	18,996,026

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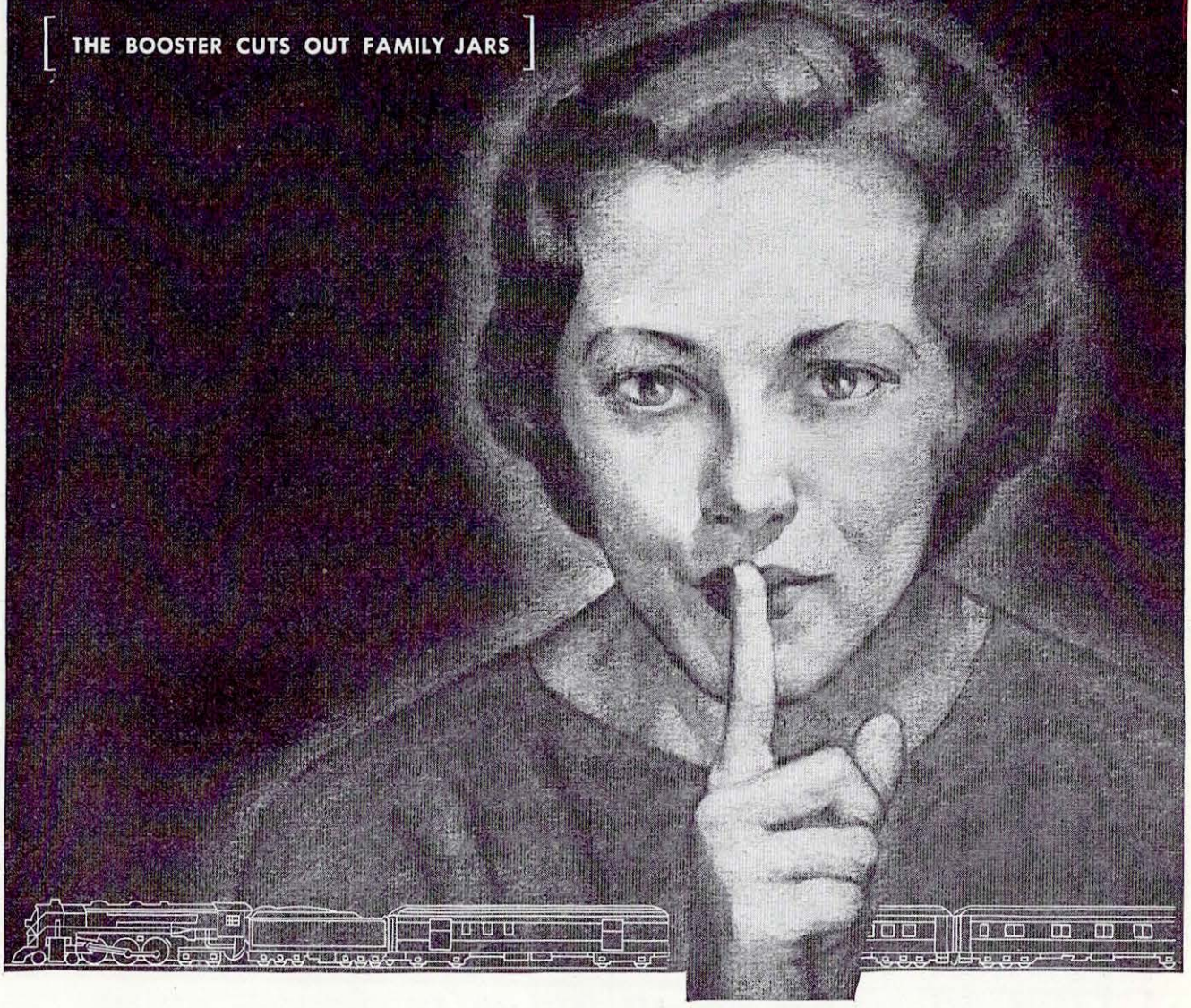
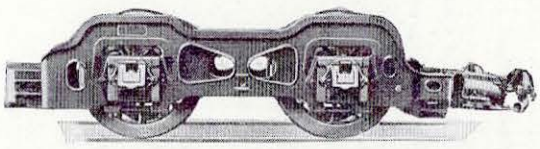
A word to the wives of traveling men . . .

[THE BOOSTER CUTS OUT FAMILY JARS]



"Oh no, Hubby wasn't always so good natured! » » He used to come home all tired out and grouchy—week ends he slept—I rarely had any of his time. » » After a while I got tired of it and did a little detective work—when he came home feeling like himself I inquired the trains he rode—suggested, oh so tactfully, he ride the trains that let him sleep. » » Now he does—and he is always rested, cheerful—the week ends are worth while now." —Booster trains let passengers sleep—and make the whole family boost the railroads.



FRANKLIN RAILWAY SUPPLY CO., INC.

NEW YORK
CHICAGO
MONTREAL

Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr. & retir. 1936	After depr. & retir. 1935	Before depr. & ret.
Green Bay & Western	Sept.	234	$120,834	$676	$126,988	$34,214	$18,615	$5,991	$42,967	$106,301	83.7	$20,687	$9,309	$2,049	$15,686	$6,567
	9 mos.	234	1,125,578	7,431	1,183,188	272,519	139,833	52,786	402,129	904,292	76.4	278,896	188,791	123,714	114,600	160,580
Gulf & Ship Island	Sept.	259	113,329	11,021	135,968	19,013	26,490	3,051	60,520	114,289	84.1	21,679	6,066	—4,760	1,584	—469
	9 mos.	259	905,407	81,781	1,100,182	166,293	164,975	30,195	535,239	949,000	86.3	151,182	15,313	—74,265	—57,293	—38,135
Gulf, Mobile & Northern	Sept.	936	588,855	28,446	642,610	58,962	79,472	37,204	160,591	364,463	56.72	278,147	220,147	156,010	130,507	178,180
	9 mos.	936	4,887,652	228,774	5,326,523	559,566	782,551	322,771	1,399,410	3,325,664	62.44	2,000,859	1,552,080	1,000,344	726,572	1,177,949
Illinois Central	Sept.	4,972	6,689,984	758,567	8,014,909	813,781	1,845,354	209,505	2,897,507	6,166,968	76.9	1,847,941	1,201,242	1,027,582	1,333,330	1,562,050
	9 mos.	4,975	58,799,551	6,725,496	71,213,381	6,696,234	16,050,963	2,033,663	26,927,220	55,385,496	77.8	15,827,885	10,309,815	8,391,032	7,192,621	13,298,661
Yazoo & Mississippi Valley	Sept.	1,619	1,504,799	99,225	1,691,950	113,747	217,146	29,980	535,628	950,764	56.2	741,186	601,693	491,774	321,334	540,962
	9 mos.	1,619	9,642,590	666,022	11,024,010	912,661	1,768,585	296,908	4,163,446	7,638,551	69.3	3,385,459	2,186,058	1,368,229	273,370	1,760,741
Illinois Central System	Sept.	6,592	8,194,783	857,792	9,706,859	927,528	2,062,500	239,485	3,433,135	7,117,732	73.3	2,589,127	1,802,496	1,529,556	1,659,664	2,113,212
	9 mos.	6,594	68,442,141	7,391,518	82,237,391	7,608,895	17,819,548	2,330,571	31,090,666	63,024,047	76.6	19,213,344	12,482,692	9,839,758	7,525,066	15,139,899
Illinois Terminal	Sept.	504	409,773	63,550	514,903	64,334	69,197	15,520	159,600	326,370	63.38	188,533	145,891	124,411	136,110	143,466
	9 mos.	511	3,417,473	612,817	4,386,936	466,155	605,769	143,302	1,426,627	2,802,395	63.88	1,584,541	1,249,890	1,084,203	817,339	1,255,468
Kansas City Southern	Sept.	878	1,057,357	20,145	1,188,064	111,271	226,331	48,693	330,111	784,154	66.0	403,910	297,410	223,298	178,775	252,560
	9 mos.	878	8,944,719	164,221	10,049,153	877,222	1,577,052	431,287	2,794,475	6,295,193	62.6	3,753,960	2,940,460	2,337,900	913,667	2,598,228
Kansas, Oklahoma & Gulf	Sept.	326	198,112	565	201,319	25,484	22,300	8,198	39,787	97,901	48.6	103,418	79,530	59,010	19,360	61,102
	9 mos.	326	1,810,845	4,807	1,839,370	235,325	199,337	70,617	398,933	877,866	47.7	961,504	770,222	590,121	343,771	608,912
Lake Superior & Ishpeming	Sept.	160	407,352	95	475,116	33,126	19,504	596	59,015	118,212	24.9	356,904	287,119	285,928	194,213	299,179
	9 mos.	160	1,969,471	878	2,258,790	259,404	227,081	5,753	357,703	904,308	40.0	1,354,482	995,347	983,190	586,326	1,102,811
Lehigh & Hudson River	Sept.	96	129,819	133	130,666	9,660	11,353	3,624	39,555	76,714	58.7	53,952	39,363	28,345	20,391	32,029
	9 mos.	96	1,142,399	1,021	1,150,371	129,242	164,953	32,701	424,175	815,611	70.9	334,760	221,125	111,817	147,523	145,689
Lehigh & New England	Sept.	218	317,326	206	320,255	39,067	68,166	5,983	111,399	238,722	74.5	81,533	61,684	62,115	62,436	80,292
	9 mos.	219	2,900,333	2,472	2,926,645	311,182	634,408	55,373	1,034,868	2,173,125	74.3	753,520	577,003	572,411	667,721	735,617
Lehigh Valley	Sept.	1,331	3,617,055	232,591	4,113,740	257,160	774,703	114,181	1,552,227	2,864,270	69.6	1,249,470	1,035,076	833,351	395,742	1,023,497
	9 mos.	1,334	31,201,318	1,976,122	35,530,823	2,204,384	6,185,861	1,013,514	15,126,431	26,009,875	73.2	9,520,948	7,655,901	6,083,842	3,163,462	7,804,844
Louisiana & Arkansas	Sept.	606	417,091	9,752	444,388	60,491	66,406	29,639	129,853	310,462	69.9	133,926	99,245	79,826	121,196	94,102
	9 mos.	606	3,963,296	89,116	4,208,056	565,781	581,742	253,524	1,058,530	2,622,605	62.3	1,585,451	1,212,216	1,016,810	805,282	1,145,709
Louisiana, Arkansas & Texas	Sept.	255	104,615	309	110,311	28,437	8,976	4,921	53,944	101,726	92.2	8,585	3,445	—16,013	4,692	—15,263
	9 mos.	255	909,559	2,417	957,381	247,789	90,099	42,020	314,417	735,674	76.8	221,707	180,921	33,416	21,561	34,166
Louisville & Nashville	Sept.	4,981	6,694,525	582,066	7,756,161	707,690	1,775,605	179,663	2,401,784	5,375,443	69.3	2,380,718	1,878,403	1,992,297	1,315,004	2,340,371
	9 mos.	4,997	55,684,288	4,845,503	65,046,364	6,602,113	14,903,461	1,625,824	21,736,624	47,707,233	73.3	17,339,131	13,149,741	13,442,457	9,565,056	16,577,673
Maine Central	Sept.	1,046	805,035	95,004	1,003,728	187,973	166,357	10,713	357,755	763,982	76.1	239,746	169,940	115,909	119,140	159,826
	9 mos.	1,046	7,329,532	755,616	8,929,128	1,657,050	1,525,866	103,053	3,389,198	7,032,851	78.8	1,896,277	1,308,077	798,923	1,207,345	1,198,950
Midland Valley	Sept.	351	146,493	4	148,897	21,183	11,037	2,200	31,437	71,415	48.0	77,482	68,056	58,097	49,563	60,229
	9 mos.	354	1,089,441	115	1,106,662	150,228	116,531	20,740	271,228	606,281	54.8	500,381	422,475	349,710	271,690	368,860
Minneapolis & St. Louis	Sept.	1,530	702,497	15,315	752,828	117,868	111,050	38,538	292,711	596,443	79.2	156,385	106,160	49,850	95,601	77,268
	9 mos.	1,583	6,248,645	111,654	6,683,125	861,458	1,085,842	326,377	2,699,903	5,305,283	79.4	1,377,842	992,497	550,166	—116,815	806,492
Minn., St. Paul & S. S. Marie	Sept.	4,296	2,073,677	107,193	2,374,851	379,548	371,990	59,265	876,964	1,795,104	75.6	579,747	404,371	234,160	795,605	335,599
	9 mos.	4,296	17,172,204	991,955	19,751,448	2,753,926	3,332,965	537,783	7,928,073	15,572,045	78.8	4,179,403	2,696,610	1,428,526	637,301	2,345,082
Duluth, South Shore & Atlantic	Sept.	550	224,173	15,480	263,999	35,136	61,386	4,274	85,670	190,924	72.3	73,075	60,344	46,720	90,986	54,315
	9 mos.	550	1,893,594	113,056	2,201,630	306,495	349,692	38,984	770,357	1,509,976	68.6	691,654	587,153	503,664	341,666	573,184
Spokane International	Sept.	163	64,193	1,200	71,572	18,114	8,618	1,859	21,856	54,735	76.5	16,837	12,487	7,017	2,159	8,620
	9 mos.	163	514,725	12,850	578,707	129,828	60,314	16,806	190,575	435,491	75.3	143,216	100,976	65,638	—8,857	79,146
Mississippi Central	Sept.	150	82,829	1,570	86,630	16,703	11,434	6,651	19,751	59,658	68.9	26,972	23,043	19,086	10,705	21,335
	9 mos.	150	651,084	12,293	683,772	112,076	101,734	61,465	180,979	503,163	73.6	180,609	147,682	115,161	31,498	135,371
Missouri-Arkansas	Sept.	364	79,337	1,402	86,871	24,442	10,064	5,446	30,324	75,676	87.1	11,195	7,052	—1,390	14,276	—557
	9 mos.	364	693,359	11,769	757,260	182,153	91,251	42,293	255,170	614,299	81.1	142,961	117,149	41,199	67,099	48,702
Missouri-Illinois	Sept.	208	87,050	837	89,938	23,859	12,448	2,297	30,043	74,508	82.8	15,430	8,871	—4,668	—4,624	—1,530
	9 mos.	208	778,913	5,952	800,872	179,746	108,856	22,218	269,900	625,713	78.1	175,159	124,074	29,827	27,812	60,481
Missouri-Kansas-Texas Lines	Sept.	3,293	2,307,004	232,897	2,783,226	345,956	430,147	120,823	902,073	1,934,853	69.5	848,373	754,983	546,750	308,917	653,809
	9 mos.	3,293	19,125,806	1,737,030	22,916,237	2,934,392	4,176,189	1,055,884	7,915,530	17,359,460	75.8	5,556,777	4,045,434	2,179,832	88,460	3,143,507
Missouri Pacific	Sept.	7,216	6,854,979	459,498	7,933,416	1,138,734	1,511,652	236,252	2,735,724	5,937,337	74.8	1,996,079	1,566,586	981,964	767,889	1,333,979
	9 mos.	7,225	56,556,108	3,747,638	65,676,220	8,917,757	12,881,433	2,163,265	23,370,221	50,056,020	76.2	15,620,200	11,732,246	7,218,133	3,100,653	10,369,853
Gulf Coast Lines	Sept.	1,763	742,203	45,149	842,301	170,124	195,796	45,136	294,452	754,722	89.60	87,579	21,396	—37,183	—130,662	—3,717
	9 mos.	1,763	8,136,462	323,783	8,945,949	1,440,246	1,671,778	402,599	2,851,680	6,796,442	75.97	2,149,507	1,572,392	645,995	201,730	952,099

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MODERNIZE

YOUR BRICK ARCHES

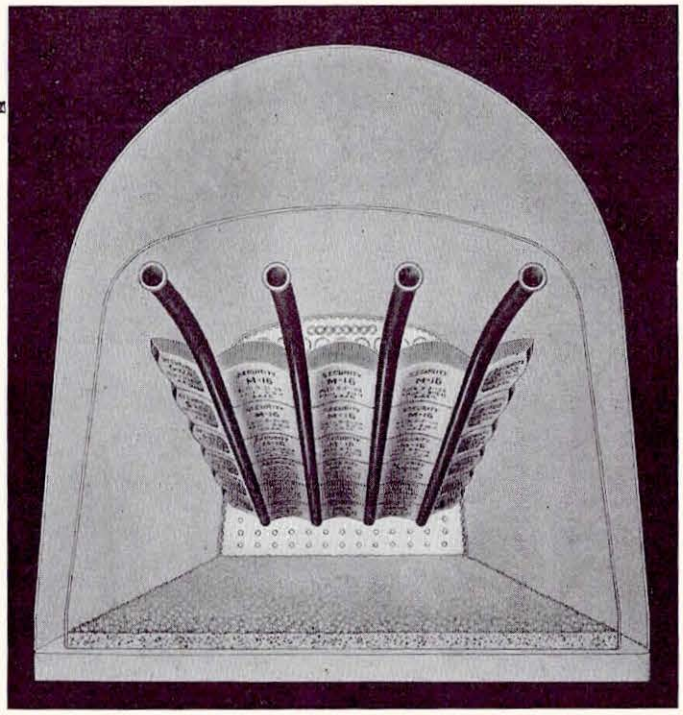
When You Modernize Your Power

The Brick Arch that was correctly designed for a locomotive fire box when the engine was originally placed in service may or may not be correct for the engine when it is modernized and its service changed.

The chances are that a different design is required. If a stoker has been applied, the original arch just can't be efficient.

American Arch Company engineers will gladly consult with you on such problems. Their experience over many years in designing and servicing fire box Brick Arches is available for the asking.

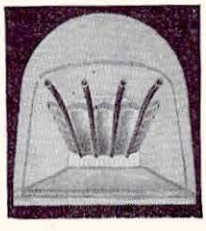
On any power you modernize be sure the Brick Arch is modernized too. Then be sure you get full effectiveness and economy from it by maintaining a complete arch at all times.



There's More to SECURITY ARCHES Than Just Brick

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists



AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr. & retir. 1936	1935	Before depr. & ret.
International-Great Northern	Sept.	1,154	$865,416	$83,540	$1,065,496	$156,786	$217,594	$31,211	$425,603	$887,081	83.26	178,415	$124,520	$26,878	$21,142	$59,072
	9 mos.	1,154	7,295,176	662,806	8,854,981	1,291,352	1,786,660	275,136	3,671,056	7,517,568	84.90	1,337,413	875,525	16,304	362,161	294,836
Mobile & Ohio	Sept.	1,201	874,337	36,508	956,277	109,393	188,104	42,585	313,541	692,488	72.4	263,789	209,517	162,492	82,141	213,757
	9 mos.	1,201	7,022,469	268,888	7,699,290	955,447	1,659,666	371,232	2,772,991	6,123,536	80.0	1,575,754	1,140,343	681,267	9,511	1,143,060
Monongahela	Sept.	171	383,234	714	386,597	38,982	25,502	449	75,093	143,069	37.0	243,528	220,037	143,633	63,557	149,138
	9 mos.	172	3,357,298	8,085	3,384,474	338,727	259,798	3,847	701,465	1,332,762	39.4	2,051,712	1,851,132	1,126,564	846,297	1,177,750
Montour	Sept.	57	220,439	.....	221,662	12,737	43,563	901	48,322	112,315	50.7	109,347	84,935	101,288	71,050	112,330
	9 mos.	57	1,689,486	129	1,700,226	125,922	372,060	8,424	392,539	963,628	56.7	736,598	557,906	712,002	655,645	810,894
Nashville, Chat. & St. Louis	Sept.	1,154	983,457	88,975	1,186,924	150,499	279,062	58,474	434,619	983,878	82.9	203,046	157,180	150,097	71,715	192,618
	9 mos.	1,154	8,372,290	818,854	10,259,153	1,332,970	2,463,794	543,678	4,011,911	8,931,245	87.1	1,327,908	919,445	838,784	262,828	1,234,608
Nevada Northern	Sept.	165	39,672	1,656	46,330	9,334	2,493	941	9,416	26,318	56.8	20,012	11,317	14,095	14,582	20,050
	9 mos.	165	350,532	10,759	403,775	75,502	32,590	7,797	82,325	233,810	57.9	169,965	97,974	123,392	42,227	176,940
New York Central	Sept.	11,218	21,236,581	5,702,998	30,568,132	3,531,813	6,657,392	548,507	10,538,665	22,781,055	74.5	7,787,077	5,551,388	4,356,071	3,797,744	5,705,605
	9 mos.	11,215	185,768,406	46,406,192	261,539,073	27,132,109	55,884,838	4,883,396	96,082,469	197,117,011	75.4	64,422,062	45,015,521	32,679,976	23,364,904	44,827,104
Pittsburgh & Lake Erie	Sept.	233	2,007,276	57,890	2,118,552	181,493	638,613	26,634	584,707	1,513,347	71.4	605,205	426,321	605,037	324,992	754,750
	9 mos.	233	14,824,047	535,010	15,761,358	1,457,032	4,753,240	236,803	4,861,801	12,052,925	76.5	3,708,433	2,381,318	3,917,998	2,885,396	5,271,223
New York, Chicago & St. Louis	Sept.	1,704	3,387,874	112,478	3,626,278	418,980	477,986	131,061	1,141,620	2,314,312	63.8	1,311,966	1,056,687	782,466	721,752	910,657
	9 mos.	1,704	28,568,596	752,728	30,360,837	2,994,810	4,328,483	1,038,504	9,958,928	19,508,563	64.3	10,852,274	8,996,423	6,493,820	4,470,175	7,651,824
New York, New Haven & Hartford	Sept.	2,038	3,673,354	2,363,664	6,808,181	728,602	1,078,437	96,227	2,414,824	4,702,357	69.1	2,105,824	1,625,824	1,068,517	713,722	1,353,240
	9 mos.	2,048	32,501,715	18,267,108	57,240,526	7,514,439	9,933,073	889,860	21,784,161	43,684,592	76.3	13,555,934	9,365,934	4,295,114	6,143,173	6,875,051
New York Connecting	Sept.	20	226,439	.....	240,936	10,026	7,045	.....	28,394	46,464	19.3	194,472	159,382	134,529	116,646	134,529
	9 mos.	20	2,003,732	.....	2,106,915	102,154	69,424	.....	288,408	471,166	22.4	1,635,749	1,322,079	1,055,092	935,044	1,055,092
New York, Ontario & Western	Sept.	566	593,281	57,719	700,109	93,719	133,286	11,818	276,398	541,035	77.3	159,074	109,975	66,805	62,792	91,356
	9 mos.	566	5,828,295	450,390	6,752,691	718,688	1,246,187	105,983	2,775,223	5,075,114	75.2	1,677,577	1,259,384	917,960	882,807	1,140,629
Norfolk & Western	Sept.	2,181	8,092,625	204,234	8,505,334	1,108,141	1,433,392	128,434	1,691,002	4,515,138	53.1	3,990,196	2,649,957	2,992,563	2,755,243	3,372,702
	9 mos.	2,168	63,695,219	1,636,183	67,303,472	8,259,864	10,609,893	1,120,067	14,674,268	36,392,969	54.1	30,910,503	21,104,322	23,492,836	17,854,968	26,875,009
Norfolk Southern	Sept.	834	338,701	9,913	367,382	72,788	51,717	22,335	137,098	306,834	83.5	60,548	28,740	16,489	6,700	27,621
	9 mos.	834	3,093,536	72,696	3,309,807	619,212	450,291	200,630	1,246,745	2,696,788	81.5	613,019	346,398	197,360	257,271	296,848
Northern Pacific	Sept.	6,727	5,619,078	345,189	6,487,669	551,159	1,075,428	155,708	1,978,207	4,124,833	63.6	2,362,836	1,833,971	2,056,729	2,022,009	2,314,688
	9 mos.	6,727	36,954,886	3,150,597	44,331,888	5,418,305	9,670,559	1,448,400	16,705,248	36,391,471	82.1	7,940,417	3,031,639	5,702,726	3,185,202	8,064,678
Northwestern Pacific	Sept.	351	236,989	79,159	346,596	44,449	60,209	4,180	163,164	285,362	82.3	61,234	53,786	46,884	16,552	60,957
	9 mos.	351	1,835,815	683,851	2,783,094	384,767	488,390	37,173	1,378,438	2,411,722	86.7	371,372	279,159	217,255	—42,439	342,648
Oklahoma City-Ada-Atoka	Sept.	132	41,846	374	44,186	14,234	6,485	732	10,811	33,627	76.1	10,559	5,839	—1,087	—1,339	—1,080
	9 mos.	132	382,869	3,600	406,862	72,657	22,189	6,691	98,942	216,780	53.3	190,082	161,991	110,511	39,071	110,576
Pennsylvania	Sept.	10,371	29,886,469	5,925,764	39,496,378	3,763,669	8,150,826	623,115	12,565,476	26,985,161	68.3	12,511,217	9,075,573	8,432,728	6,546,213	10,316,376
	9 mos.	10,410	240,969,706	50,007,656	320,019,854	28,968,245	65,554,626	5,699,882	111,087,415	228,342,101	71.4	91,677,753	66,256,780	59,098,596	49,853,406	75,560,246
Long Island	Sept.	396	531,056	1,583,029	2,224,759	313,785	393,938	21,367	959,603	1,750,157	78.7	474,602	123,689	—62,674	99,347	35,254
	9 mos.	396	4,816,191	13,567,337	19,272,927	1,498,180	3,372,185	175,156	8,704,172	14,355,655	74.5	4,917,272	2,442,501	978,771	616,655	1,853,156
Pennsylvania-Reading Seashore Line	Sept.	412	309,230	302,294	641,944	58,437	69,731	13,615	332,562	502,573	78.3	139,371	32,014	—98,486	—174,710	—91,210
	9 mos.	412	2,357,396	2,557,000	5,128,768	532,658	685,940	107,819	2,680,302	4,260,325	83.1	868,443	7,492	—908,408	—1,296,630	—842,864
Pere Marquette	Sept.	2,115	2,230,682	77,468	2,467,063	314,479	530,083	66,391	860,001	1,868,332	75.7	598,731	383,776	294,408	444,112	504,453
	9 mos.	2,115	21,204,999	729,418	23,220,364	2,643,186	4,882,737	582,318	8,346,410	17,330,443	74.6	5,889,921	4,382,099	3,521,947	2,802,226	5,421,532
Pittsburg & Shawmut	Sept.	103	42,768	332	43,670	8,671	15,373	1,029	14,292	42,130	96.5	1,540	—84	2,412	—8,458	8,045
	9 mos.	103	367,005	2,772	376,312	96,091	142,684	10,916	128,579	405,506	107.7	—29,194	—41,010	—18,810	33,686	33,301
Pittsburgh & West Virginia	Sept.	138	325,114	.....	340,366	64,936	73,979	16,662	67,179	254,096	74.7	86,270	59,956	102,438	108,744	124,059
	9 mos.	138	2,670,642	.....	2,822,657	350,023	638,573	149,081	553,119	1,916,711	67.9	905,946	685,467	971,611	707,820	1,170,593
Pittsburg, Shawmut & Northern	Sept.	190	95,859	22	97,564	16,083	19,890	1,377	31,158	74,731	76.6	22,833	20,550	12,550	—7,688	15,226
	9 mos.	190	753,296	384	766,510	158,011	156,982	12,356	278,985	665,443	86.8	101,067	80,739	25,055	—3,921	49,204
Reading	Sept.	1,456	4,214,055	316,508	4,745,063	366,371	845,857	73,512	1,702,940	3,213,640	67.7	1,531,423	1,048,190	1,125,027	1,066,079	1,386,917
	9 mos.	1,456	38,380,886	2,935,517	43,164,410	3,168,410	7,426,839	670,417	16,423,572	29,745,478	68.9	13,418,932	9,690,967	10,033,331	8,555,372	12,416,695
Richmond, Fredericksburg & Potomac	Sept.	117	293,939	160,845	563,544	58,518	121,800	8,663	199,286	426,631	75.7	136,913	90,636	77,195	321	103,538
	9 mos.	117	2,840,445	1,642,430	5,558,127	532,945	1,117,569	80,815	2,186,899	4,320,804	77.7	1,237,323	867,441	503,713	281,525	745,270
Rutland	Sept.	407	194,355	39,836	299,184	46,843	54,619	11,285	133,490	260,951	87.2	38,233	24,867	24,494	16,616	36,080
	9 mos.	407	1,734,557	288,158	2,550,354	408,651	491,082	95,629	1,251,621	2,376,543	93.2	173,811	56,606	55,414	—116,846	159,216
St. Louis-San Francisco	Sept.	4,928	3,727,282	306,826	4,381,359	646,506	987,775	111,149	1,471,292	3,404,344	77.7	977,015	659,498	677,269	467,201	943,522
	9 mos.	4,928	29,319,582	2,477,165	34,800,889	5,142,844	8,328,620	1,015,596	12,564,920	28,661,559	82.4	6,139,330	3,454,071	3,579,909	973,776	5,993,634

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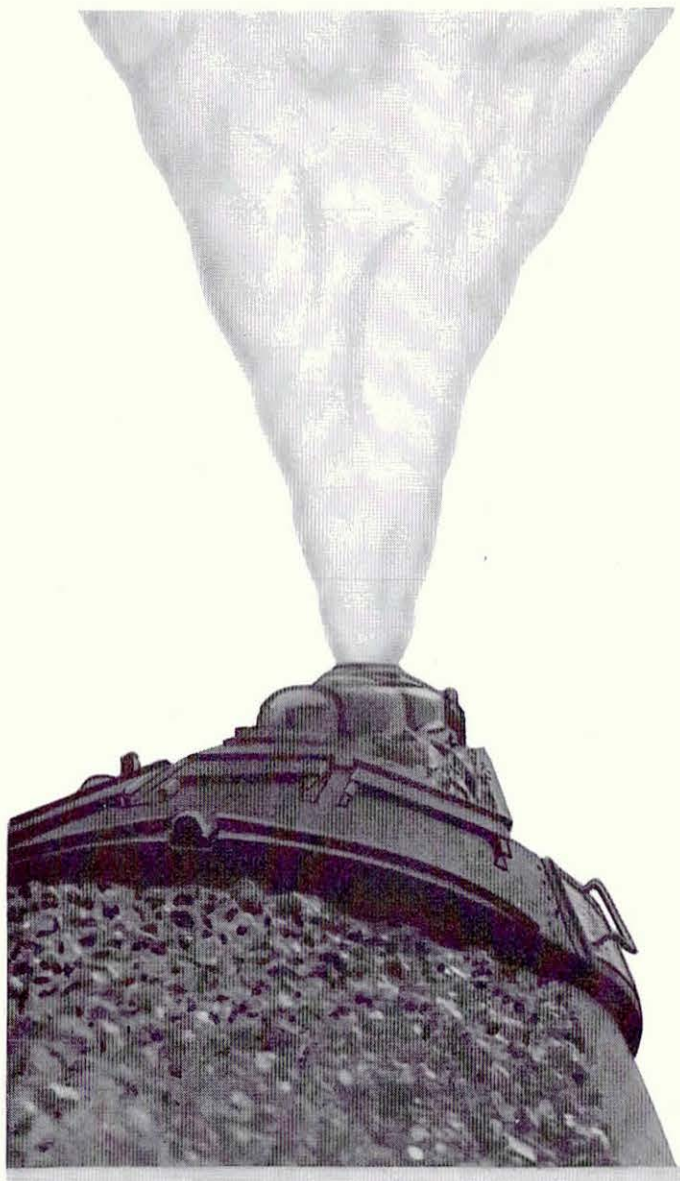

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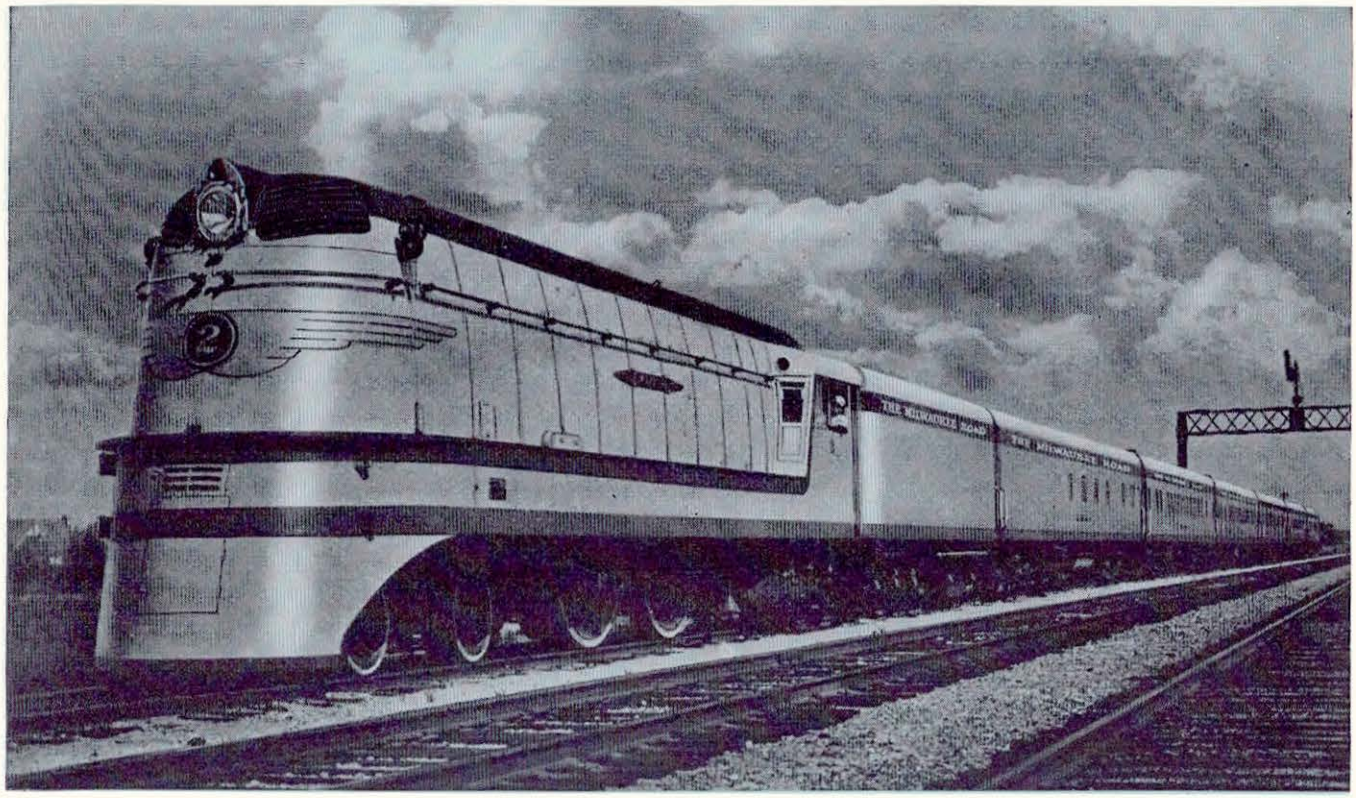
Revenues and Expenses of Railways

MONTH OF SEPTEMBER AND NINE MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr. & retir. 1936	After depr. & retir. 1935	Before depr. & ret.
Ft. Worth & Rio Grande	Sept.	233	$26,638	$779	$35,560	$11,032	$7,507	$2,069	$20,613	$43,376	122.0	—$7,816	—$11,960	—$16,670	—$20,365	—$16,619
	9 mos.	233	273,586	8,645	346,574	122,507	71,953	19,349	203,031	441,712	127.5	—95,138	—133,113	—195,545	—204,299	—195,088
St. Louis, San Francisco & Texas	Sept.	261	123,527	743	127,777	38,616	14,020	5,746	49,852	114,822	89.9	12,955	5,875	—31,414	—26,029	—31,313
	9 mos.	261	954,244	7,077	996,095	342,464	125,867	50,547	425,190	1,004,860	100.9	—8,765	—64,039	—357,207	—354,447	—356,037
St. Louis Southwestern Line	Sept.	1,749	1,422,150	34,510	1,522,505	204,827	252,049	76,544	413,117	1,016,533	66.8	505,972	405,566	302,328	194,233	352,541
	9 mos.	1,772	13,189,757	206,779	13,921,305	1,676,590	2,213,626	681,239	4,230,105	9,435,803	67.8	4,485,502	3,652,090	2,253,839	1,706,444	2,707,935
Seaboard Air Line	Sept.	4,307	2,349,728	295,875	2,971,805	437,562	639,199	156,849	1,076,400	2,473,592	83.2	498,213	398,213	363,290	69,856	520,995
	9 mos.	4,307	21,382,135	3,428,890	27,595,848	4,027,408	5,923,918	1,361,490	10,514,119	23,470,843	85.1	4,125,005	2,400,005	1,669,729	1,222,758	3,080,679
Southern Ry.	Sept.	6,641	6,781,584	904,471	8,400,007	926,214	1,491,034	144,052	2,710,102	5,572,916	66.3	2,827,091	2,282,283	1,978,811	1,601,734	2,251,074
	9 mos.	6,641	56,638,281	7,237,884	69,843,579	8,499,061	12,768,720	1,338,456	24,394,464	49,707,616	71.2	20,135,963	15,988,390	13,399,651	9,098,346	15,835,498
Alabama Great Southern	Sept.	315	487,667	60,573	588,342	94,176	118,764	10,915	171,186	415,744	70.7	172,598	129,936	109,020	80,319	132,065
	9 mos.	315	3,983,374	454,385	4,783,867	782,108	1,035,899	103,427	1,489,012	3,587,671	75.0	1,196,196	847,763	654,275	242,886	863,534
Cinn., New Orleans & Texas Pac.	Sept.	336	1,203,643	96,649	1,376,015	171,345	288,409	27,269	310,510	846,962	61.6	529,053	409,013	391,591	329,797	442,029
	9 mos.	336	10,783,469	885,123	12,343,395	1,556,810	2,314,454	238,294	2,929,584	7,466,323	60.5	4,877,072	3,861,439	3,575,503	2,531,527	4,025,962
Georgia Southern & Florida	Sept.	397	132,434	27,285	176,501	31,306	39,216	1,666	70,421	147,946	83.8	28,555	16,031	9,611	1,038	16,371
	9 mos.	397	1,161,428	367,045	1,702,486	282,260	359,927	16,477	745,027	1,464,818	86.0	237,668	124,855	45,095	17,975	108,544
New Orleans & Northeastern	Sept.	204	225,078	20,033	263,708	31,757	37,374	5,166	74,531	159,455	60.5	104,253	81,499	59,761	43,086	65,652
	9 mos.	204	1,688,966	169,417	2,003,572	260,909	313,498	49,248	631,936	1,350,123	67.4	653,449	443,745	248,450	126,656	303,273
Northern Alabama	Sept.	100	52,945	2,020	57,063	15,907	1,308	871	17,457	37,485	65.7	19,578	15,786	1,982	11,649	2,051
	9 mos.	100	476,423	16,872	510,284	96,575	12,652	10,448	156,828	292,322	57.3	217,962	182,438	73,369	11,351	74,000
Southern Pacific	Sept.	8,772	11,274,359	1,734,357	14,081,183	1,198,714	2,054,664	301,084	5,153,421	9,564,399	67.9	4,516,784	3,777,718	3,052,993	1,751,413	3,515,548
	9 mos.	8,772	85,258,415	15,607,240	109,377,975	10,625,217	18,344,061	2,796,236	40,651,411	79,768,524	73.0	29,509,451	21,909,871	16,273,048	11,109,318	20,571,586
Southern Pacific Steamship Line	Sept.	....	522,297	30,852	573,190	36,285	106,491	15,740	402,228	579,548	101.1	—6,358	—6,044	—6,296	—46,746	29,072
	9 mos.	....	3,946,707	190,689	4,294,023	174,009	838,218	151,015	3,051,791	4,385,204	102.1	—91,181	—129,799	—132,065	—430,950	186,131
Texas & New Orleans	Sept.	4,430	2,984,696	303,532	3,577,198	500,870	646,496	120,098	1,200,960	2,699,728	75.5	877,470	713,707	562,768	131,191	700,456
	9 mos.	4,430	24,597,138	2,532,575	29,480,859	4,204,879	5,847,980	1,091,596	10,142,293	23,324,799	79.1	6,156,060	4,120,678	2,578,487	952,512	3,832,146
Spokane, Portland & Seattle	Sept.	946	744,524	47,453	846,483	190,113	84,066	9,790	259,617	572,967	67.7	273,516	201,572	124,017	190,008	140,523
	9 mos.	946	5,080,917	433,686	5,971,041	842,299	723,454	83,132	2,109,790	4,016,458	67.3	1,954,583	1,325,844	822,251	1,058,275	970,740
Tennessee Central	Sept.	286	207,429	5,286	225,748	34,616	28,999	6,462	71,936	151,392	67.1	74,356	60,517	45,027	47,380	50,997
	9 mos.	286	1,668,202	48,277	1,818,839	311,244	258,586	51,217	.597,024	1,303,872	71.7	514,967	435,723	318,809	301,389	372,584
Texas & Pacific	Sept.	1,949	1,922,398	266,947	2,372,785	255,461	470,291	81,951	710,996	1,655,346	69.8	717,439	573,555	470,732	535,484	567,836
	9 mos.	1,949	16,565,900	1,981,550	20,143,137	2,250,177	3,701,589	694,983	6,087,755	13,955,650	69.3	6,187,487	4,881,235	3,746,138	3,352,318	4,621,496
Texas Mexican	Sept.	162	84,696	618	98,756	16,848	15,508	3,332	33,488	76,558	77.5	22,198	15,976	7,570	—370	9,413
	9 mos.	162	866,786	4,314	967,220	156,513	137,005	30,006	314,801	703,218	72.7	264,002	209,985	151,827	167,174	168,384
Toledo, Peoria & Western	Sept.	239	180,008	5	183,546	58,846	14,364	16,813	49,102	147,833	80.5	35,713	26,278	7,630	25,367	19,932
	9 mos.	239	1,757,606	64	1,782,005	502,578	119,688	150,862	424,870	1,284,387	72.1	497,618	386,990	223,999	113,393	330,029
Union Pacific System	Sept.	9,918	12,676,682	1,506,918	15,331,491	1,666,494	2,604,726	278,264	4,458,581	9,882,997	64.5	5,448,494	4,294,036	3,336,046	3,074,206	3,878,715
	9 mos.	9,847	88,745,141	11,283,433	109,204,608	13,394,370	21,688,426	2,885,888	35,513,174	80,783,074	74.0	28,421,534	18,652,368	12,978,979	10,495,740	17,825,299
Utah	Sept.	111	110,827	.....	110,963	20,391	19,432	392	23,638	68,030	61.3	42,933	36,219	36,628	26,468	46,461
	9 mos.	111	727,653	.....	730,018	135,869	194,567	4,028	176,818	551,316	75.5	178,702	106,048	105,519	32,783	193,937
Virginian	Sept.	619	1,560,238	3,828	1,618,336	132,663	251,456	20,281	253,210	691,482	52.7	926,854	806,854	880,680	533,224	974,492
	9 mos.	619	12,127,146	35,009	12,633,910	980,181	2,243,153	169,182	2,145,305	5,812,167	46.0	6,821,743	5,736,743	6,226,574	5,063,711	7,067,446
Wabash	Sept.	2,447	3,368,785	215,239	3,848,303	508,788	693,115	146,141	1,411,174	2,915,065	75.7	933,238	721,172	444,750	436,258	621,534
	9 mos.	2,447	29,549,444	1,840,861	33,826,621	4,141,502	6,211,350	1,283,318	12,677,440	25,736,107	76.1	8,090,514	6,284,363	3,681,785	3,141,017	5,280,355
Ann Arbor	Sept.	293	305,083	3,233	323,533	30,959	89,276	12,480	131,056	275,664	85.2	47,869	30,227	19,633	59,647	39,592
	9 mos.	293	2,762,091	31,540	2,908,843	265,287	670,035	108,106	1,231,999	2,389,212	82.1	519,631	364,533	259,880	371,022	440,532
Western Maryland	Sept.	882	1,350,527	7,483	1,386,837	191,653	272,460	35,639	318,007	866,027	62.4	520,810	420,810	424,491	331,716	519,257
	9 mos.	882	11,516,000	71,730	11,885,528	1,576,996	2,509,636	328,909	2,950,905	7,819,857	65.8	4,065,671	3,195,671	3,271,125	2,912,630	4,126,037
Western Pacific	Sept.	1,207	1,535,292	38,770	1,606,932	322,737	282,184	54,416	555,422	1,257,942	78.3	348,990	267,636	155,940	159,990	209,978
	9 mos.	1,207	9,754,110	330,560	10,369,893	2,583,291	2,113,204	511,017	4,100,000	9,691,090	93.5	678,803	—46,472	—723,862	—40,606	—260,672
Wheeling & Lake Erie	Sept.	512	1,312,979	2,252	1,401,488	185,742	303,254	31,643	390,297	941,638	67.2	459,850	319,655	384,262	310,285	451,449
	9 mos.	512	10,620,056	17,015	11,296,370	1,586,394	2,647,430	274,692	3,299,729	8,091,852	71.6	3,204,518	2,054,656	2,398,632	1,604,639	3,161,522
Wichita Falls & Southern	Sept.	203	55,899	48	59,856	9,614	6,274	1,494	14,447	35,063	58.58	24,793	21,663	18,904	5,493	20,832
	9 mos.	203	368,428	891	421,870	81,153	53,098	14,313	127,140	303,902	72.04	117,968	89,493	69,377	69,359	86,945

Table of Freight Operating Statistics begins on next left-hand page



THE REIGNING QUEEN

THE "HIAWATHA" is the 6-hour 30-minute train of the Chicago, Milwaukee, St. Paul and Pacific Railroad, operating between Chicago, Milwaukee and St. Paul, a distance of 410 miles.

The locomotive was guaranteed originally for 6 cars. Later, a seventh car was added, and still later an eighth car was added and the locomotive kept right on making the same exacting schedule.

Now, after only 16 months of operation, this train has been replaced with even more luxurious equipment. The new cars have been built of lighter, high-tensile steel, and the saving in weight will allow the addition of another car. No change in the locomotive. Former schedules are maintained.

THE "HIAWATHA" OF 1937 — NINE CARS — THE REIGNING QUEEN OF ALL SPEEDLINERS.

Alco

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET, NEW YORK CITY

Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of July,

Region, road, and year		Miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (*thousands*)	Car-miles: Per cent loaded	Ton-miles (*thousands*): Gross, excluding locomotives and tenders	Ton-miles (*thousands*): Net, revenue and non-revenue	Number of road locomotives on line: Serviceable: Not stored	Number of road locomotives on line: Serviceable: Stored	Number of road locomotives on line: Unserviceable	Number of road locomotives on line: Per cent unserviceable
New England Region:													
Boston & Albany	1936	373	126,901	131,082	8,607	3,026	65.7	161,175	53,298	54	11	27	29.3
	1935	373	114,673	118,952	7,781	2,735	66.2	143,932	46,724	49	15	32	33.3
Boston & Maine	1936	1,963	261,575	292,181	27,023	9,193	70.5	491,030	183,416	122	7	166	56.3
	1935	1,971	240,135	264,930	23,951	8,068	71.1	416,256	155,380	119	3	166	57.6
N. Y., New Hav. & Hartf.	1936	2,011	345,293	415,986	22,333	11,641	65.9	628,189	226,726	169	21	99	34.9
	1935	2,050	334,817	407,271	20,104	10,402	65.2	567,117	203,169	178	11	112	37.2
Great Lakes Region:													
Delaware & Hudson	1936	831	208,614	279,174	31,318	7,141	66.9	431,886	204,125	104	134	35	12.8
	1935	835	184,327	240,879	25,395	5,734	64.3	347,282	156,931	94	151	28	10.3
Del., Lack. & Western	1936	983	355,469	393,674	51,038	11,688	67.9	671,925	259,762	135	1	107	44.0
	1935	992	279,789	311,356	40,688	8,658	66.0	495,152	186,220	105	44	87	36.9
Erie (incl. Chi. & Erie)	1936	2,298	700,914	741,259	39,553	30,471	65.3	1,844,451	684,830	212	46	217	45.7
	1935	2,305	629,072	658,640	39,234	25,189	64.8	1,529,453	561,584	201	72	200	42.3
Grand Trunk Western	1936	1,027	257,364	258,561	1,869	6,667	64.6	394,218	139,531	84	1	55	39.3
	1935	1,007	223,338	225,233	1,962	6,068	61.7	362,026	118,828	70	..	71	50.4
Lehigh Valley	1936	1,312	374,596	397,258	45,737	12,852	66.8	789,484	331,134	125	11	151	52.6
	1935	1,335	311,374	329,576	35,066	9,815	65.0	603,411	238,480	146	8	162	51.3
New York Central	1936	10,789	2,595,809	2,724,873	155,307	87,749	61.2	5,560,385	2,282,208	849	117	550	36.3
	1935	10,919	2,219,121	2,322,219	127,235	70,876	60.8	4,411,036	1,739,560	689	187	637	42.1
N. Y., Chicago & St. Louis	1936	1,672	471,202	477,915	7,448	16,532	64.8	983,925	371,442	150	14	29	15.0
	1935	1,661	400,934	403,299	4,799	12,782	63.0	755,142	263,407	121	52	18	9.4
Pere Marquette	1936	2,081	353,654	367,345	6,275	9,006	63.0	559,349	210,454	113	4	33	22.0
	1935	2,096	300,304	310,922	3,756	6,805	61.1	435,489	165,260	106	8	45	28.3
Pittsburgh & Lake Erie	1936	234	83,325	85,416	50	3,290	62.0	279,379	159,762	31	14	23	33.8
	1935	234	61,526	64,705	....	2,490	57.7	216,895	120,769	26	6	39	54.9
Wabash	1936	2,435	617,751	628,363	12,870	18,518	65.7	1,078,512	375,233	132	29	147	47.7
	1935	2,435	497,725	506,136	10,830	14,744	63.1	858,067	276,838	122	39	163	50.3
Central Eastern Region:													
Baltimore & Ohio	1936	6,366	1,530,594	1,877,323	191,919	47,016	63.1	3,194,473	1,442,886	679	14	603	46.5
	1935	6,319	1,211,596	1,454,138	143,037	34,259	62.4	2,252,202	959,362	575	140	604	45.8
Central of New Jersey	1936	681	145,709	166,812	31,574	4,664	61.3	312,348	143,156	56	12	79	53.7
	1935	684	132,143	147,528	25,023	4,006	59.6	271,040	123,994	57	14	85	54.5
Chicago & Eastern Illinois	1936	931	163,433	163,892	2,688	4,221	68.9	247,050	104,199	49	3	55	51.4
	1935	939	152,504	153,545	2,326	3,112	67.6	182,519	74,510	41	6	62	56.9
Elgin, Joliet & Eastern	1936	434	94,620	95,307	1,010	2,469	62.9	183,810	91,854	57	..	30	34.5
	1935	434	80,111	80,611	473	1,825	62.6	136,445	66,972	51	2	33	38.4
Long Island	1936	393	30,669	31,190	16,314	271	48.9	21,720	8,115	31	4	15	30.0
	1935	393	27,267	27,940	13,798	224	53.6	16,627	6,308	34	..	19	35.8
Pennsylvania System	1936	9,801	3,073,002	3,466,014	395,954	109,320	64.0	7,326,862	3,299,530	1,400	127	855	35.9
	1935	10,009	2,502,774	2,817,654	283,665	85,530	62.8	5,630,872	2,401,854	1,191	258	1,022	41.4
Reading	1936	1,449	400,886	434,395	49,497	11,236	61.8	799,162	375,764	190	65	102	28.6
	1935	1,452	333,894	358,650	38,602	8,812	60.0	623,565	282,057	173	91	104	28.3
Pocahontas Region:													
Chesapeake & Ohio	1936	3,050	850,101	893,145	38,001	39,829	56.8	3,334,404	1,815,652	391	66	75	14.1
	1935	3,050	711,575	739,690	27,226	28,656	55.3	2,385,732	1,258,641	339	115	104	18.6
Norfolk & Western	1936	2,145	663,630	706,782	34,520	28,060	60.6	2,280,985	1,210,474	253	65	45	12.4
	1935	2,145	538,616	558,576	22,430	20,555	59.1	1,657,882	854,913	211	119	52	13.6
Southern Region:													
Atlantic Coast Line	1936	5,121	553,743	557,229	7,423	10,871	64.3	588,174	210,432	218	63	116	29.2
	1935	5,148	478,700	479,189	6,566	8,518	62.3	458,133	157,128	257	59	132	29.5
Central of Georgia	1936	1,886	266,607	267,851	4,333	5,501	70.6	296,817	107,922	97	..	27	21.8
	1935	1,886	236,475	237,421	4,059	4,837	66.3	264,230	92,869	103	..	38	27.0
Illinois Central (incl. Y. & M. V.)	1936	6,562	1,553,656	1,566,592	29,548	37,295	64.5	2,316,880	938,898	638	18	228	25.8
	1935	6,587	1,319,295	1,327,258	24,494	30,224	63.0	1,866,499	733,904	592	29	251	28.8
Louisville & Nashville	1936	4,989	1,050,447	1,145,808	27,390	24,981	60.3	1,741,268	825,912	339	24	211	36.8
	1935	5,046	863,435	925,499	21,221	18,680	59.9	1,269,933	584,003	275	26	280	48.2
Seaboard Air Line	1936	4,295	442,692	457,940	3,562	10,858	67.6	597,797	221,904	210	20	107	31.8
	1935	4,295	420,879	424,385	1,983	8,520	65.4	477,153	164,970	189	24	132	38.3
Southern	1936	6,596	1,296,474	1,315,788	21,426	30,098	67.6	1,619,715	608,844	488	41	261	33.0
	1935	6,599	1,132,602	1,145,719	18,780	24,536	65.7	1,324,870	477,835	404	53	348	43.2
Northwestern Region:													
Chicago & North Western	1936	8,355	1,095,932	1,147,287	31,156	28,925	61.8	1,823,496	650,813	396	105	201	28.6
	1935	8,428	876,450	924,566	23,848	22,323	64.9	1,328,644	457,644	426	99	232	30.6
Chicago Great Western	1936	1,458	262,030	265,147	11,676	7,981	65.2	476,825	179,914	64	2	22	25.0
	1935	1,458	209,634	209,850	7,483	5,936	62.1	357,306	126,276	54	6	35	36.8
Chi., Milw., St. P. & Pac.	1936	11,120	1,481,816	1,592,351	71,541	40,418	60.7	2,565,977	992,463	500	59	120	17.7
	1935	11,119	1,158,943	1,220,798	53,972	29,726	62.1	1,827,390	706,160	376	105	174	26.6
Chi., St. P., Minneap. & Om.	1936	1,637	231,817	246,301	12,889	5,440	67.3	333,304	136,413	99	24	22	15.2
	1935	1,641	195,377	201,251	8,817	3,958	66.7	234,767	95,986	64	39	40	28.0
Great Northern	1936	8,080	836,732	832,837	25,784	28,559	58.6	2,032,402	927,437	362	43	178	30.5
	1935	8,041	692,023	696,611	17,891	22,483	60.9	1,516,614	673,659	335	83	180	30.1
Minneap., St. P. & S. St. M.	1936	4,273	383,051	389,891	5,469	8,631	67.0	513,512	218,346	120	..	36	23.1
	1935	4,274	363,966	368,317	2,745	7,815	66.8	443,295	185,954	122	..	37	23.3
Northern Pacific	1936	6,429	732,416	806,330	56,908	22,197	65.2	1,343,132	529,980	349	11	86	19.3
	1935	6,416	611,129	670,205	44,113	17,239	67.3	1,028,693	391,302	323	6	125	27.5
Central Western Region:													
Alton	1936	928	217,707	228,258	1,656	5,071	63.4	324,335	128,089	75	4	21	21.0
	1935	921	192,892	203,413	1,459	4,080	57.7	270,896	91,805	72	..	30	29.4
Atch., Top. & S. Fe (incl. P. & S. F.&G.C. & S.F.)	1936	13,228	1,975,769	2,139,354	99,786	56,821	61.3	3,674,315	1,206,962	575	79	317	32.6
	1935	13,260	1,691,718	1,770,345	66,139	45,545	61.8	2,837,880	901,622	506	132	366	36.5
Chicago, Burl. & Quincy	1936	8,937	1,347,527	1,413,720	57,832	36,748	61.0	2,285,225	963,014	440	3	99	18.3
	1935	8,971	1,105,019	1,154,151	40,402	26,393	62.4	1,553,933	644,292	432	9	98	18.2
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)	1936	8,179	1,235,119	1,265,114	8,003	28,686	65.0	1,736,218	664,666	377	29	299	42.4
	1935	8,272	1,041,747	1,058,193	6,274	22,518	62.0	1,366,618	484,162	365	13	346	47.8
Denv. & Rio Gr. Western	1936	2,584	281,565	311,190	37,012	7,526	67.8	466,495	191,979	173	4	27	13.2
	1935	2,584	225,468	243,892	24,014	5,727	67.9	340,106	139,939	151	17	47	21.9
Southern Pac.—Pac. Lines	1936	8,614	1,548,839	1,684,236	189,755	48,556	60.7	3,141,272	1,021,626	546	63	182	23.0
	1935	8,599	1,192,466	1,288,332	135,774	38,580	58.2	2,525,338	769,972	402	121	258	33.0
Union Pacific*	1936	9,828	1,835,717	1,908,860	121,796	56,649	60.5	3,622,010	1,216,380	644	51	170	19.7
	1935	9,809	1,499,062	1,559,030	92,533	45,884	61.8	2,782,800	955,253	541	90	257	28.9
Southwestern Region:													
Mo.-Kans.-Texas Lines	1936	3,282	393,684	398,444	6,248	10,824	63.3	656,286	239,422	101	23	76	38.0
	1935	3,282	357,646	361,063	4,874	9,531	62.9	565,444	196,699	84	21	89	45.9
Missouri Pacific	1936	7,201	1,223,488	1,272,948	28,837	34,397	63.7	2,133,866	829,003	343	70	124	23.1
	1935	7,202	1,033,575	1,061,684	21,010	27,311	64.6	1,637,406	618,914	257	130	151	28.1
St. Louis-San Francisco	1936	4,888	732,396	738,231	10,812	15,875	63.3	979,467	392,607	271	83	69	16.3
	1935	4,993	640,002	648,344	7,790	13,391	64.4	803,038	322,941	259	106	67	15.5
St. Louis Southw. Lines	1936	1,733	260 024	261,549	3,371	7,223	63.0	424,955	146,770	99	11	8	6.8
	1935	1,774	242,974	244,467	3,167	6,084	58.5	373,358	116,014	100	11	9	7.5
Texas & New Orleans	1936	4,416	546,355	547,185	10,615	12,146	61.5	773,662	277,469	200	40	58	19.5
	1935	4,420	519,017	519,035	9,042	10,946	56.5	719,673	223,119	185	53	59	19.9
Texas & Pacific	1936	1,945	313,445	313,445	1,805	9,138	59.1	580,651	188,983	69	52	95	44.0
	1935	1,945	273,651	273,651	2,591	8,262	66.3	485,211	164,591	79	72	72	32.3

NOTE:—Effective with carrier reports for the month of January, 1936, the rules relative to operating statistics of large steam railways were revised with the following effect on this statement: Miles of road operated, number of locomotives on line, and number of freight cars on line were changed from averages for the month to actual figures as of the close of the month. Freight train and locomotive-miles, which formerly applied only to freight trains and the *freight proportion of mixed trains*, based on car-miles, were changed to apply to freight trains and all mixed trains handling more freight-train cars than passenger-train cars. Carriers were not required to rework 1935 figures according to the revised rules, but they have in some cases supplied considerable comparable data. In other cases, the figures shown in this statement for last year were restated by the carriers from last year's reports, or inserted from such reports by the Bureau of Statistics.

* Includes Los Angeles & Salt Lake, Oregon Short Line, Oregon-Washington R. R. & Navigation Co., and St. Joseph & Grand Island, leased January 1, 1936.

1936, Compared with July, 1935, for Roads with Annual Operating Revenues above $25,000,000

Region, road, and year	Number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
New England Region:													
Boston & Albany....1936	2,325	3,696	6,021	26.2	21,481	1,278	422	17.6	266	23.0	4,610	151	49.0
1935	2,762	4,047	6,809	25.7	21,235	1,262	410	17.1	214	18.9	4,039	156	42.6
Boston & Maine....1936	8,171	6,555	14,726	17.2	25,362	1,885	704	20.0	394	28.0	3,013	97	35.4
1935	8,352	6,972	15,324	14.7	23,654	1,740	649	19.3	324	23.6	2,544	102	32.8
N. Y., New Hav. & Hartf..1936	12,386	9,617	22,003	21.8	26,131	1,852	668	19.5	315	24.5	3,637	99	49.2
1935	14,765	10,366	25,731	16.0	24,789	1,722	617	19.5	361	20.5	3,197	100	45.8
Great Lakes Region:													
Delaware & Hudson....1936	8,912	3,300	12,212	5.1	29,284	2,084	985	28.6	556	29.0	7,927	104	36.3
1935	10,967	2,546	13,513	4.8	26,155	1,903	860	27.4	378	21.4	6,060	107	30.8
Del., Lack. & Western....1936	13,790	6,008	19,798	17.1	31,641	1,917	741	22.2	421	27.9	8,527	124	59.3
1935	16,523	6,574	23,097	11.3	26,798	1,799	677	21.5	265	18.7	6,056	140	46.7
Erie (incl. Chi. & Erie)...1936	17,075	19,477	36,552	3.3	43,374	2,652	985	22.5	615	41.9	9,615	91	53.0
1935	22,423	11,345	33,768	5.8	40,243	2,451	900	22.3	529	36.6	7,859	90	47.3
Grand Trunk Western....1936	4,139	6,762	10,901	16.2	30,418	1,551	549	20.9	407	30.1	4,382	88	60.0
1935	4,577	6,592	11,169	19.5	31,930	1,631	535	19.6	332	27.4	3,808	91	52.0
Lehigh Valley 1936	11,570	9,409	20,979	6.8	38,174	2,156	904	25.8	512	29.7	8,139	111	50.0
1935	14,162	6,617	20,779	10.7	33,426	1,981	783	24.3	371	23.5	5,761	126	37.7
New York Central....1936	102,247	64,386	166,633	21.5	36,052	2,166	889	26.0	443	27.8	6,823	95	61.2
1935	122,620	60,685	183,305	19.3	34,135	1,988	784	24.5	306	20.5	5,139	97	52.2
N. Y., Chicago & St. Louis.1936	5,795	9,065	14,860	3.4	37,925	2,091	789	22.5	834	57.3	7,167	81	81.1
1935	7,915	6,817	14,732	4.8	35,292	1,887	658	20.6	562	43.3	5,117	84	68.9
Pere Marquette 1936	7,718	6,118	13,836	5.4	26,721	1,583	596	23.4	471	32.0	3,262	88	79.6
1935	10,173	4,715	14,888	4.3	24,351	1,454	552	24.3	361	24.3	2,544	89	64.2
Pittsburgh & Lake Erie....1936	14,810	11,710	26,520	40.4	47,578	3,380	1,933	48.6	196	6.5	22,040	83	40.0
1935	15,019	11,649	26,668	46.6	50,476	3,435	1,913	48.5	142	5.1	16,671	87	29.4
Wabash 1936	11,209	9,969	21,178	4.2	34,827	1,766	614	20.3	578	43.3	4,971	98	67.1
1935	13,972	8,267	22,239	2.8	34,444	1,745	563	18.8	407	34.4	3,668	103	50.8
Central Eastern Region:													
Baltimore & Ohio....1936	67,780	27,826	95,606	18.1	27,608	2,118	957	30.7	487	25.1	7,311	130	51.5
1935	73,931	20,546	94,477	19.1	25,567	1,884	803	28.0	328	18.8	7,898	137	39.1
Central of New Jersey....1936	11,181	9,932	21,113	32.1	26,252	2,239	1,026	30.7	221	11.8	6,779	135	43.5
1935	12,494	8,540	21,034	30.1	25,555	2,137	977	31.0	185	10.0	5,848	145	35.7
Chicago & Eastern Illinois..1936	3,258	3,532	6,790	8.6	27,190	1,516	639	24.7	505	29.7	3,609	120	49.8
1935	3,730	2,502	6,232	13.0	23,569	1,200	490	23.9	395	24.4	2,560	130	46.1
Elgin, Joliet & Eastern....1936	7,757	4,596	12,353	5.3	17,929	1,982	990	37.2	237	10.1	6,826	100	35.9
1935	7,747	2,496	10,243	7.2	17,340	1,748	858	36.7	206	9.0	4,977	110	30.2
Long Island 1936	676	2,720	3,396	2.3	5,430	735	275	29.9	71	4.8	667	311	30.7
1935	774	2,622	3,396	4.4	5,102	622	236	28.2	57	3.8	518	333	25.4
Pennsylvania System 1936	193,521	64,843	258,364	17.8	34,102	2,430	1,094	30.2	414	21.4	10,860	109	52.2
1935	236,096	52,107	288,203	15.8	32,678	2,292	978	28.1	268	15.2	7,741	113	40.6
Reading 1936	25,441	11,397	36,838	11.4	25,053	1,998	940	33.4	330	16.0	8,365	130	44.6
1935	30,771	7,472	38,243	8.9	24,276	1,873	847	32.0	241	12.6	6,268	146	34.8
Pocahontas Region:													
Chesapeake & Ohio....1936	38,938	14,064	53,002	1.4	55,875	3,961	2,157	45.6	1,105	42.6	19,204	67	56.6
1935	41,006	10,498	51,504	2.4	49,458	3,377	1,781	43.9	777	32.0	13,312	72	44.2
Norfolk & Western....1936	30,188	5,872	36,060	1.6	50,318	3,463	1,838	43 1	1,058	40.5	18,206	95	65.2
1935	34,607	4,648	39,255	2.8	46,494	3,098	1,597	41.6	726	29.5	12,858	100	48.8
Southern Region:													
Atlantic Coast Line....1936	18,302	5,961	24,263	26.4	19,536	1,065	381	19.4	275	22.1	1,326	110	46.0
1935	23,003	4,367	27,370	20.6	17,579	960	329	18.4	187	16.2	985	121	35.1
Central of Georgia....1936	3,403	3,444	6,847	3.8	20,411	1,120	407	19.6	508	36.7	1,846	116	70.8
1935	6,079	1,913	7,992	22.7	20,318	1,124	395	19.2	375	29.5	1,589	122	55.3
Illinois Central (incl. Y. & M. V.)....1936	35,079	20,634	55,713	28.0	25,573	1,501	608	25.2	542	33.4	4,615	119	59.0
1935	42,933	17,005	59,938	35.1	24,844	1,422	559	24.3	403	26.3	3,594	123	49.2
Louisville & Nashville....1936	36,852	9,976	46,828	23.7	25,475	1,660	787	33.1	566	28.4	5,340	116	66.4
1935	40,709	7,354	48,063	27.9	23,232	1,473	678	31.3	388	20.9	3,734	127	52.3
Seaboard Air Line....1936	8,801	4,734	13,535	2.3	22,646	1,371	509	20.4	518	37.5	1,667	116	45.0
1935	10,083	3,182	13,265	4.3	20,176	1,153	399	19.4	393	30.9	1,239	120	40.2
Southern 1936	22,541	17,387	39,928	17.0	21,315	1,256	472	20.2	489	35.8	2,978	144	54.6
1935	25,338	14,343	39,681	13.1	20,668	1,176	424	19.5	384	30.1	2,336	151	46.7
Northwestern Region:													
Chicago & North Western..1936	35,333	26,617	61,950	9.4	25,604	1,670	596	22.5	344	24.8	2,513	109	54.7
1935	42,259	24,749	67,008	9.7	23,264	1,521	524	20.5	220	16.5	1,752	114	40.4
Chicago Great Western....1936	1,675	5,172	6,847	2.4	31,116	1,824	688	22.5	918	62.5	3,981	115	102.1
1935	1,949	3,153	5,102	2.3	31,919	1,707	603	21.3	822	62.2	2,794	120	73.8
Chi., Milw., St. P. & Pac..1936	41,579	24,862	66,441	2.6	27,666	1,743	674	24.6	487	32.7	2,879	112	78.7
1935	49,617	16,387	66,004	2.5	25,120	1,584	612	23.8	345	23.4	2,049	116	62.8
Chi., St. P., Minneap. & Om.1936	3,070	6,770	9,840	10.2	18,640	1,451	594	25.1	467	27.7	2,688	99	57.7
1935	2,143	7,130	9,273	10.2	17,927	1,207	493	24.3	341	21.0	1,886	108	47.1
Great Northern 1936	36,221	13,215	49,436	9.1	37,564	2,449	1,118	32.5	615	32.3	3,703	91	46.9
1935	40,526	10,467	50,993	6.3	35,070	2,205	980	30.0	428	23.4	2,702	102	38.5
Minneap., St. P. & S. St. M.1936	12,286	5,132	17,418	5.8	21,278	1,344	572	25.3	406	23.9	1,648	92	81.8
1935	13,635	4,875	18,510	4.7	19,911	1,224	514	23.8	330	20.7	1,404	95	74.3
Northern Pacific 1936	26,592	6,792	33,384	10.5	28,680	1,846	728	23.9	510	32.8	2,659	136	62.7
1935	32,416	5,827	38,243	11.9	27,646	1,697	646	22.7	330	21.6	1,967	145	50.9
Central Western Region:													
Alton 1936	2,337	6,739	9,076	23.0	33,025	1,497	591	25.3	455	28.5	4,451	106	74.9
1935	2,253	6,863	9,116	20.6	32,388	1,410	478	22.5	328	25.3	3,215	103	64.8
Atch., Top. & S. Fe (incl. P. & S.F.&G.C. & S.F.)..1936	64,337	14,408	78,745	10.9	34,118	1,866	613	21.2	490	37.7	2,943	110	74.2
1935	72,109	11,310	83,419	11.2	31,500	1,682	534	19.8	350	28.6	2,193	112	59.0
Chicago, Burl. & Quincy...1936	25,782	19,024	44,806	7.2	28,097	1,707	719	26.2	699	43.7	3,476	109	88.0
1935	31,476	14,284	45,760	8.0	24,415	1,412	586	24.4	452	29.6	2,317	117	71.5
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)....1936	22,760	13,629	36,389	9.7	24,623	1,409	539	23.2	575	38.2	2,622	120	58.1
1935	29,225	11,251	40,476	13.8	22,941	1,314	466	21.5	380	28.5	1,888	125	47.3
Denv. & Rio Gr. Western..1936	12,625	4,868	17,493	6.5	25,934	1,664	685	25.5	370	21.4	2,397	150	55.3
1935	13,342	3,499	16,841	6.1	23,265	1,516	624	24.4	272	16.4	1,747	157	39.8
Southern Pac.—Pac. Lines.1936	31,876	30,270	62,146	7.4	32,087	2,046	665	21.0	541	42.4	3,826	100	76.8
1935	34,067	25,930	59,997	8.5	33,502	2,133	650	20.0	415	35.8	2,888	99	59.6
Union Pacific* 1936	40,114	23,077	63,191	10.9	39,043	1,985	667	21.5	651	50.1	3,992	112	75.5
1935	42,122	16,919	59,041	16.8	38,906	1,869	642	20.8	517	40.2	3,141	105	60.0
Southwestern Region:													
Mo.-Kans.-Texas Lines 1936	4,723	5,186	9,909	6.6	30,334	1,670	609	22.1	778	55.5	2,353	79	65.3
1935	5,665	3,752	9,417	3.5	29,033	1,583	551	20.6	672	51.8	1,933	78	60.8
Missouri Pacific 1936	14,994	22,956	37,950	3.1	29,688	1,753	681	24.1	678	44.2	3,714	111	77.8
1935	18,935	18,363	37,298	3.7	28,279	1,588	600	22.7	548	37.4	2,772	116	64.3
St. Louis-San Francisco....1936	16,972	7,994	24,966	6.9	25,472	1,340	537	24.7	507	32.4	2,591	120	57.1
1935	20,567	6,051	26,618	5.6	23,219	1,258	506	24.1	391	25.2	2,087	121	49.0
St. Louis Southw. Lines....1936	2,678	3,230	5,908	3.5	30,304	1,638	566	20.3	740	57.8	2,732	87	72.4
1935	3,181	3,539	6,720	5.7	29,258	1,540	478	19.1	524	47.0	2,110	87	66.6
Texas & New Orleans....1936	7,033	10,342	17,375	7.8	25,664	1,426	512	22.8	489	34.8	2,027	87	60.6
1935	7,105	9,401	16,506	8.9	25,860	1,394	432	20.4	415	36.0	1,628	86	56.6
Texas & Pacific....1936	2,685	4,851	7,536	3.9	32,404	1,856	604	20.7	776	63.6	3,134	84	47.1
1935	2,729	4,282	7,011	5.7	30,719	1,775	602	19.9	736	55.8	2,729	79	40.0

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

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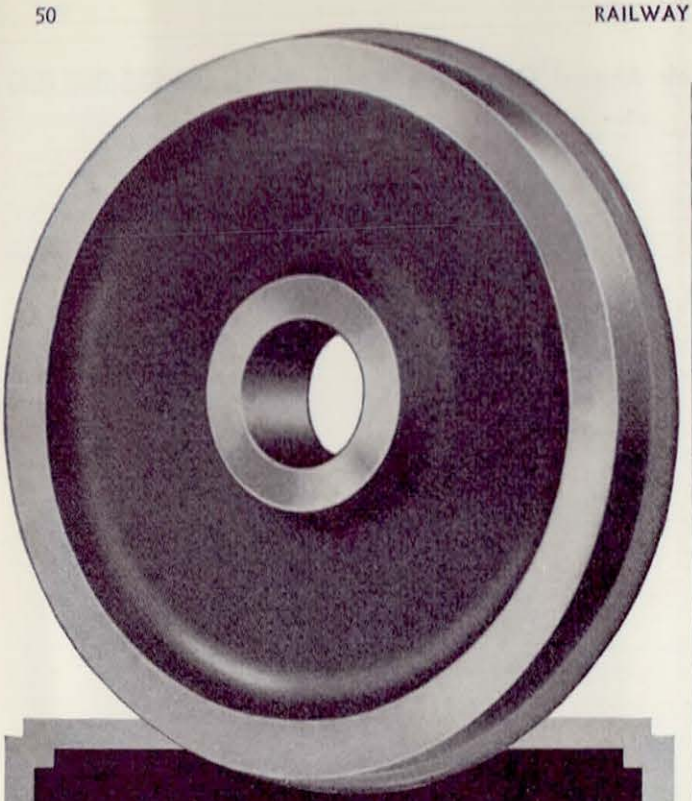
LOCOMOTIVE CRANES
CRAWLER CRANES
SHOVELS
OHIO
THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS OHIO

Pittsburgh Spring & Steel Co.
1417 Farmers Bank Building, Pittsburgh, Pa.
Makers of Elliptic and Spiral SPRINGS of Every Description
Carbon, Vanadium, Silico-Manganese Steels.
Licensed manufacturers under patents for "Coil-Elliptic" groupings.
Washington, D. C. 824 Union Trust Bldg.
New York 3723 Grand Central Terminal
Chicago 1401 Fisher Bldg.

1936, Compared with July, 1935, for Roads with Annual Operating Revenues above $25,000,000

Region, road, and year	Number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive day
New England Region:													
Boston & Albany.....1936	2,325	3,696	6,021	26.2	21,481	1,278	422	17.6	266	23.0	4,610	151	49.0
1935	2,762	4,047	6,809	25.7	21,235	1,262	410	17.1	214	18.9	4,039	156	42.6
Boston & Maine.....1936	8,171	6,555	14,726	17.2	25,362	1,885	704	20.0	394	28.0	3,013	97	35.4
1935	8,352	6,972	15,324	14.7	23,654	1,740	649	19.3	324	23.6	2,544	102	32.8
N. Y., New Hav. & Hartf..1936	12,386	9,617	22,003	21.8	26,131	1,852	668	19.5	315	24.5	3,637	99	49.2
1935	14,765	10,366	25,731	16.0	24,789	1,722	617	19.5	361	20.5	3,197	100	45.8
Great Lakes Region:													
Delaware & Hudson.....1936	8,912	3,300	12,212	5.1	29,284	2,084	985	28.6	556	29.0	7,927	104	36.3
1935	10,967	2,546	13,513	4.8	26,155	1,903	860	27.4	378	21.4	6,060	107	30.8
Del., Lack. & Western.....1936	13,790	6,008	19,798	17.1	31,641	1,917	741	22.2	421	27.9	8,527	124	59.3
1935	16,523	6,574	23,097	11.3	26,798	1,799	677	21.5	265	18.7	6,056	140	46.7
Erie (incl. Chi. & Erie)...1936	17,075	19,477	36,552	3.3	43,374	2,652	985	22.5	615	41.9	9,615	91	53.0
1935	22,423	11,345	33,768	5.8	40,243	2,451	900	22.3	529	36.6	7,859	90	47.3
Grand Trunk Western.....1936	4,139	6,762	10,901	16.2	30,418	1,551	549	20.9	407	30.1	4,382	88	60.0
1935	4,577	6,592	11,169	19.5	31,930	1,631	535	19.6	332	27.4	3,808	91	52.0
Lehigh Valley 1936	11,570	9,409	20,979	6.8	38,174	2,156	904	25.8	512	29.7	8,139	111	50.0
1935	14,162	6,617	20,779	10.7	33,426	1,981	783	24.3	371	23.5	5,761	126	37.7
New York Central.....1936	102,247	64,386	166,633	21.5	36,052	2,166	889	26.0	443	27.8	6,823	95	61.2
1935	122,620	60,685	183,305	19.3	34,135	1,988	784	24.5	306	20.5	5,139	97	52.2
N. Y., Chicago & St. Louis.1936	5,795	9,065	14,860	3.4	37,925	2,091	789	22.5	834	57.3	7,167	81	81.1
1935	7,915	6,817	14,732	4.8	35,292	1,887	658	20.6	562	43.3	5,117	84	68.9
Pere Marquette 1936	7,718	6,118	13,836	5.4	26,721	1,583	596	23.4	471	32.0	3,262	88	79.6
1935	10,173	4,715	14,888	4.3	24,351	1,454	552	24.3	361	24.3	2,544	89	64.2
Pittsburgh & Lake Erie....1936	14,810	11,710	26,520	40.4	47,578	3,380	1,933	48.6	196	6.5	22,040	83	40.0
1935	15,019	11,649	26,668	46.6	50,476	3,435	1,913	48.5	142	5.1	16,671	87	29.4
Wabash 1936	11,209	9,969	21,178	4.2	34,827	1,766	614	20.3	578	43.3	4,971	98	67.1
1935	13,972	8,267	22,239	2.8	34,444	1,745	563	18.8	407	34.4	3,668	103	50.8
Central Eastern Region:													
Baltimore & Ohio.....1936	67,780	27,826	95,606	18.1	27,608	2,118	957	30.7	487	25.1	7,311	130	51.5
1935	73,931	20,546	94,477	19.1	25,567	1,884	803	28.0	328	18.8	7,898	137	39.1
Central of New Jersey.....1936	11,181	9,932	21,113	32.1	26,252	2,239	1,026	30.7	221	11.8	6,779	135	43.5
1935	12,494	8,540	21,034	30.1	25,555	2,137	977	31.0	185	10.0	5,848	145	35.7
Chicago & Eastern Illinois..1936	3,258	3,532	6,790	8.6	27,190	1,516	639	24.7	505	29.7	3,609	120	49.8
1935	3,730	2,502	6,232	13.0	23,569	1,200	490	23.9	395	24.4	2,560	130	46.1
Elgin, Joliet & Eastern.....1936	7,757	4,596	12,353	5.3	17,929	1,982	990	37.2	237	10.1	6,826	100	35.9
1935	7,747	2,496	10,243	7.2	17,340	1,748	858	36.7	206	9.0	4,977	110	30.2
Long Island 1936	676	2,720	3,396	2.3	5,430	735	275	29.9	71	4.8	667	311	30.7
1935	774	2,622	3,396	4.4	5,102	622	236	28.2	57	3.8	518	333	25.4
Pennsylvania System 1936	193,521	64,843	258,364	17.8	34,102	2,430	1,094	30.2	414	21.4	10,860	109	52.2
1935	236,096	52,107	288,203	15.8	32,678	2,292	978	28.1	268	15.2	7,741	113	40.6
Reading 1936	25,441	11,397	36,838	11.4	25,053	1,998	940	33.4	330	16.0	8,365	130	44.6
1935	30,771	7,472	38,243	8.9	24,276	1,873	847	32.0	241	12.6	6,268	146	34.8
Pocahontas Region:													
Chesapeake & Ohio.....1936	38,938	14,064	53,002	1.4	55,875	3,961	2,157	45.6	1,105	42.6	19,204	67	56.6
1935	41,006	10,498	51,504	2.4	49,458	3,377	1,781	43.9	777	32.0	13,312	72	44.2
Norfolk & Western.....1936	30,188	5,872	36,060	1.6	50,318	3,463	1,838	43.1	1,058	40.5	18,206	95	65.2
1935	34,607	4,648	39,255	2.8	46,494	3,098	1,597	41.6	726	29.5	12,858	100	48.8
Southern Region:													
Atlantic Coast Line.....1936	18,302	5,961	24,263	26.4	19,536	1,065	384	19.4	275	22.1	1,326	110	46.0
1935	23,003	4,367	27,370	20.6	17,579	960	329	18.4	187	16.2	985	121	35.1
Central of Georgia.....1936	3,403	3,444	6,847	3.8	20,411	1,120	407	19.6	508	36.7	1,846	116	70.8
1935	6,079	1,913	7,992	22.7	20,318	1,124	395	19.2	375	29.5	1,589	122	55.3
Illinois Central (incl. Y. & M. V.).....1936	35,079	20,634	55,713	28.0	25,573	1,501	608	25.2	542	33.4	4,615	119	59.0
1935	42,933	17,005	59,938	35.1	24,844	1,422	559	24.3	403	26.3	3,594	123	49.2
Louisville & Nashville.....1936	36,852	9,976	46,828	23.7	25,475	1,660	787	33.1	566	28.4	5,340	116	66.4
1935	40,709	7,354	48,063	27.9	23,232	1,473	678	31.3	388	20.9	3,734	127	52.3
Seaboard Air Line.....1936	8,801	4,734	13,535	2.3	22,646	1,371	509	20.4	518	37.5	1,667	116	45.0
1935	10,083	3,182	13,265	4.3	20,176	1,153	399	19.4	393	30.9	1,239	120	40.2
Southern 1936	22,541	17,387	39,928	17.0	21,315	1,256	472	20.2	489	35.8	2,978	144	54.6
1935	25,338	14,343	39,681	13.1	20,668	1,176	424	19.5	384	30.1	2,336	151	46.7
Northwestern Region:													
Chicago & North Western..1936	35,333	26,617	61,950	9.4	25,604	1,670	596	22.5	344	24.8	2,513	109	54.7
1935	42,259	24,749	67,008	9.7	23,264	1,521	524	20.5	220	16.5	1,752	114	40.4
Chicago Great Western....1936	1,675	5,172	6,847	2.4	31,116	1,824	688	22.5	918	62.5	3,981	115	102.1
1935	1,949	3,153	5,102	2.3	31,919	1,707	603	21.3	822	62.2	2,794	120	73.8
Chi., Milw., St. P. & Pac..1936	41,579	24,862	66,441	2.6	27,666	1,743	674	24.6	487	32.7	2,879	112	78.7
1935	49,617	16,387	66,004	2.5	25,120	1,584	612	23.8	345	23.4	2,049	116	62.8
Chi., St. P., Minneap. & Om.1936	3,070	6,770	9,840	10.2	18,640	1,451	594	25.1	467	27.7	2,688	99	57.7
1935	2,143	7,130	9,273	10.2	17,927	1,207	493	24.3	341	21.0	1,886	108	47.1
Great Northern 1936	36,221	13,215	49,436	9.1	37,564	2,449	1,118	32.5	615	32.3	3,703	91	46.9
1935	40,526	10,467	50,993	6.3	35,070	2,205	980	30.0	428	23.4	2,702	102	38.5
Minneap., St. P. & S. St. M.1936	12,286	5,132	17,418	5.8	21,278	1,344	572	25.3	406	23.9	1,648	92	81.8
1935	13,635	4,875	18,510	4.7	19,911	1,224	514	23.8	330	20.7	1,404	95	74.3
Northern Pacific 1936	26,592	6,792	33,384	10.5	28,680	1,846	728	23.9	510	32.8	2,659	136	62.7
1935	32,416	5,827	38,243	11.9	27,646	1,697	646	22.7	330	21.6	1,967	145	50.9
Central Western Region:													
Alton 1936	2,337	6,739	9,076	23.0	33,025	1,497	591	25.3	455	28.5	4,451	106	74.9
1935	2,253	6,863	9,116	20.6	32,388	1,410	478	22.5	328	25.3	3,215	103	64.8
Atch., Top. & S. Fe (incl. P. & S.F.&G.C. & S.F.)..1936	64,337	14,408	78,745	10.9	34,118	1,866	613	21.2	490	37.7	2,943	110	74.2
	72,109	11,310	83,419	11.2	31,500	1,682	534	19.8	350	28.6	2,193	112	59.0
Chicago, Burl. & Quincy...1936	25,782	19,024	44,806	7.2	28,097	1,707	719	26.2	699	43.7	3,476	109	88.0
1935	31,476	14,284	45,760	8.0	24,415	1,412	586	24.4	452	29.6	2,317	117	71.5
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)....1936	22,760	13,629	36,389	9.7	24,623	1,409	539	23.2	575	38.2	2,622	120	58.1
	29,225	11,251	40,476	13.8	22,941	1,314	466	21.5	380	28.5	1,888	125	47.3
Denv. & Rio Gr. Western..1936	12,625	4,868	17,493	6.5	25,934	1,664	685	25.5	370	21.4	2,397	150	55.3
1935	13,342	3,499	16,841	6.1	23,265	1,516	624	24.4	272	16.4	1,747	157	39.8
Southern Pac.—Pac. Lines.1936	31,876	30,270	62,146	7.4	32,087	2,046	665	21.0	541	42.4	3,826	100	76.8
1935	34,067	25,930	59,997	8.5	33,502	2,133	650	20.0	415	35.8	2,888	99	59.6
Union Pacific* 1936	40,114	23,077	63,191	10.9	39,043	1,985	667	21.5	651	50.1	3,992	112	75.5
1935	42,122	16,919	59,041	16.8	38,906	1,869	642	20.8	517	40.2	3,141	105	60.0
Southwestern Region:													
Mo.-Kans.-Texas Lines 1936	4,723	5,186	9,909	6.6	30,334	1,670	609	22.1	778	55.5	2,353	79	65.3
1935	5,665	3,752	9,417	3.5	29,033	1,583	551	20.6	672	51.8	1,933	78	60.8
Missouri Pacific 1936	14,994	22,956	37,950	3.1	29,688	1,753	681	24.1	678	44.2	3,714	111	77.8
1935	18,935	18,363	37,298	3.7	28,279	1,588	600	22.7	548	37.4	2,772	116	64.3
St. Louis-San Francisco....1936	16,972	7,994	24,966	6.9	25,472	1,340	537	24.7	507	32.4	2,591	120	57.1
1935	20,567	6,051	26,618	5.6	23,219	1,258	506	24.1	391	25.2	2,087	121	49.0
St. Louis Southw. Lines....1936	2,678	3,230	5,908	3.5	30,304	1,638	566	20.3	740	57.8	2,732	87	72.4
1935	3,181	3,539	6,720	5.7	29,258	1,540	478	19.1	524	47.0	2,110	87	66.6
Texas & New Orleans.....1936	7,033	10,342	17,375	7.8	25,664	1,426	512	22.8	489	34.8	2,027	87	60.6
1935	7,105	9,401	16,506	8.9	25,860	1,394	432	20.4	415	36.0	1,628	86	56.6
Texas & Pacific.....1936	2,685	4,851	7,536	3.9	32,404	1,856	604	20.7	776	63.6	3,134	84	47.1
1935	2,729	4,282	7,011	5.7	30,719	1,775	602	19.9	736	55.8	2,729	79	40.0

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.



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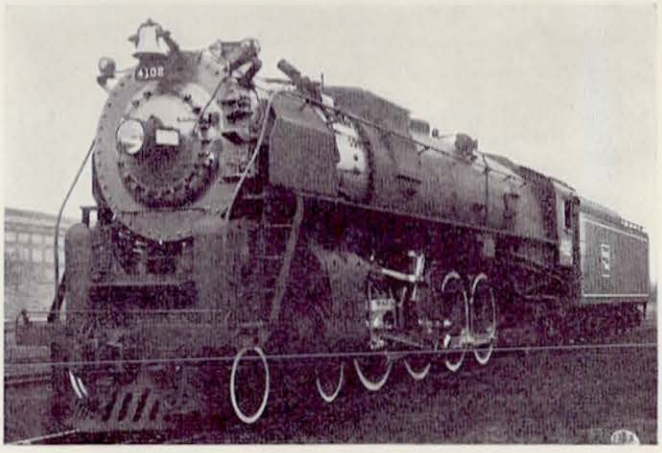

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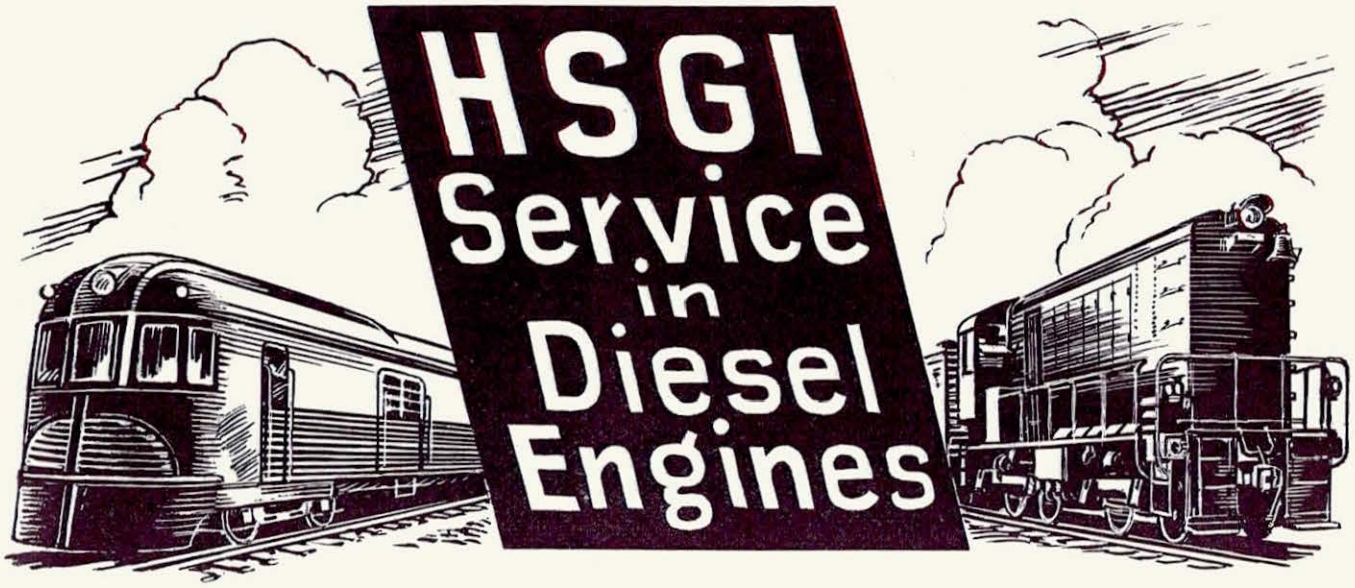

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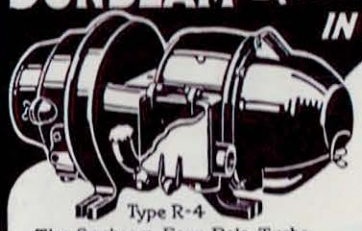

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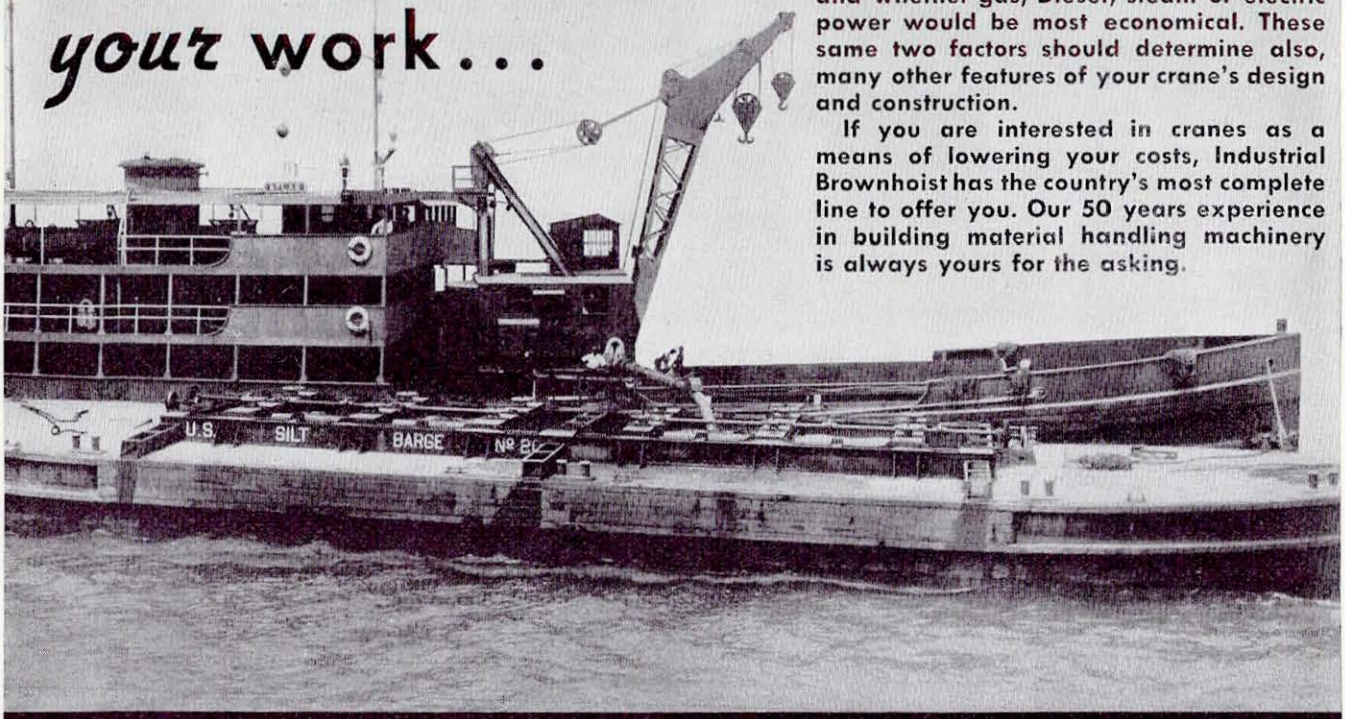

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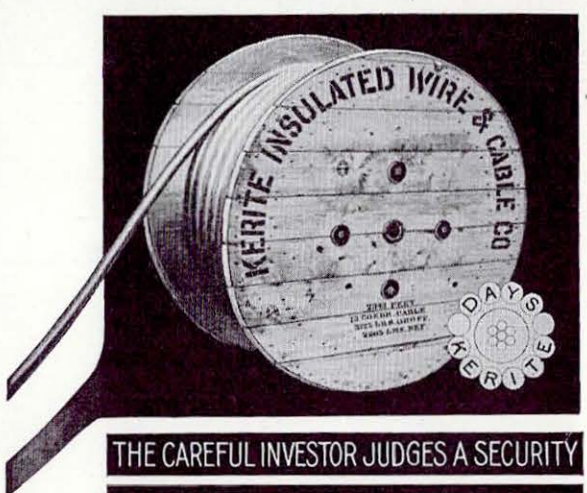

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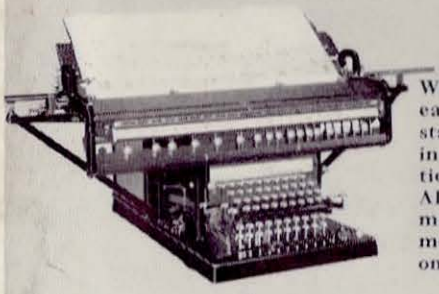

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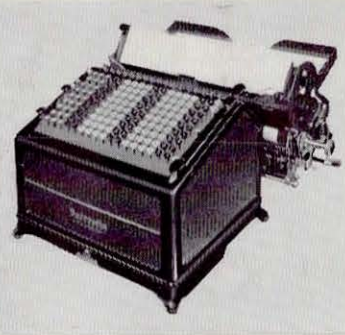

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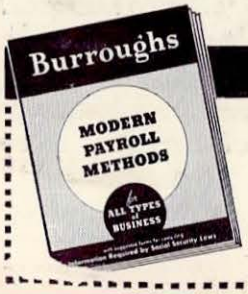

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